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Telephone Traffic

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A PAPER on telephony before this institution is under a certain disadvantage, because it is difficult to tell the earnest telephone men anything about telephony that they do not already know, and it is difficult to tell the non-telephone men anything about telephony that they care to know. In attempting to describe the improvements that have been made in the conduct of telephone traffic and to indicate the relation between traffic efficiency and engineering economy I shall hope at the least to provide a topic for discussion which may interest those members who are not directly engaged in telephony, as well as those who are.

I have always held that the study of the traffic is the most important part of a telephone man's work. The claim of reasoning which leads to this conclusion is simple. The sole object of a telephone system is to supply telephonic communication, and telephonic communication consists of hundreds or thousands, or hundreds of thousands, of daily telephone connections. Each connection consists of a certain number of operations, each operation involving a definite performance by apparatus and by a manipulator. Therefore, the principal aim of the telephone engineer should be to put the apparatus and the manipulators in a position to execute those various operations with maximum accuracy and celerity. The efficiency—efficiency here meaning accuracy combined with celerity—of the individual connection is the object to be attained, and efficiency of the connection requires efficiency in each step.

Even if the result were solely the supply of the most effective service possible to the public, the accurate and rapid production of the individual connection should be the chief solicitude of the telephone engineer. But the matter goes much deeper than that. It affects the whole engineering design of the system, and it affects both the capital charges and the working costs. Any gain, however slight, in the accuracy or the rapidity of manufacturing the individual telephone connection is felt throughout the whole system. It reduces the size of the plant in proportion to output and so reduces capital charges, and it reduces the amount of work done in proportion to output and so reduces working costs.

I have read somewhere a remark, attributed to a famous member of this institution, which aptly illustrates the point. Sitting on a mountain side, he said, "I let fall this grain of sand, and the whole earth feels the shock." Telephone men might well use this as a text. If in a telephone system, where hundreds of thousands, sometimes even millions of operations are performed daily, we make any one of those oft-repeated operations more accurate or more rapid, the whole system feels the effect. The gain of a second, or of a fraction of a second, on an operation many times repeated each day, has, in a large telephone system, a cash value running into handsome figures.

The importance of the study of telephone traffic, then, cannot be overestimated, and it is clear that the efforts of all who are engaged in the design and conduct of telephone systems are ultimately focussed on the production of accurate and rapid telephone connections. There are many different functions to be performed in a modern telephone system, as there are in a modern battleship; but the true function of the battleship is straight and rapid shooting, and the true function of the telephone system is straight and rapid operating. The cook of the battleship does his share in straight and rapid shooting by keeping the gunners' digestions in order, and in the telephone system even the humble wayleave officer or the storekeeper has his indirect share in the production of accurate and rapid operating.

The improvements in telephone exchange apparatus during the past ten years have been revolutionary. The history of telephone exchange working, covering now about twenty-five years, may be roughly divided into two periods: one of about sixteen years, in which the apparatus was mainly experimental, and many different systems were tried, but none was produced capable of dealing with a large daily traffic with real accuracy and rapidity; and one of about eight years, in which there has been perfected and standardized apparatus, largely automatic in its working, capable of the greatest accuracy and rapidity in operation. In the old apparatus the percentage of error was very great, owing to the distances between the signals and the jacks and plugs they were related to, and owing to lack of definiteness in some of the signals, on many occasions they worked at the wrong time, and on others they failed to work when required to. With regard to rapidity of operating, the old apparatus was relatively slow in working for a variety of reasons. The distance between the signals and the jacks and plugs imposed a certain strain on the operator's attention and memory, the replacement of signals occupied time, and the lack of definiteness of some of the signals and the total absence of some essential signals necessitated a certain amount of supervision of each connection by one or more operators to insure a reasonably accurate and satisfactory service.

In the standard apparatus of to-day all these conditions have been changed. The use of lamp signals enables many things to be done which were impossible before. The prime advantages of lamp signals are that they are extremely compact, they have no working parts, and therefore may be

placed in any position, vertical, horizontal, or at an angle; they are automatic in action or self-effacing; since the signal disappears immediately the current is cut off; and finally, they give a much more positive and assertive signal than any form of indicator. These various qualities enable several radical improvements to be made. The signals are placed immediately adjacent to the jacks or cords they control, which, in large switchboards, is impossible with electro-magnetic indicators; the line lamp is immediately above or below its corresponding answering-jack and the supervisory lamps are in line with the connecting cords and close to them. With this arrangement the operator loses no time

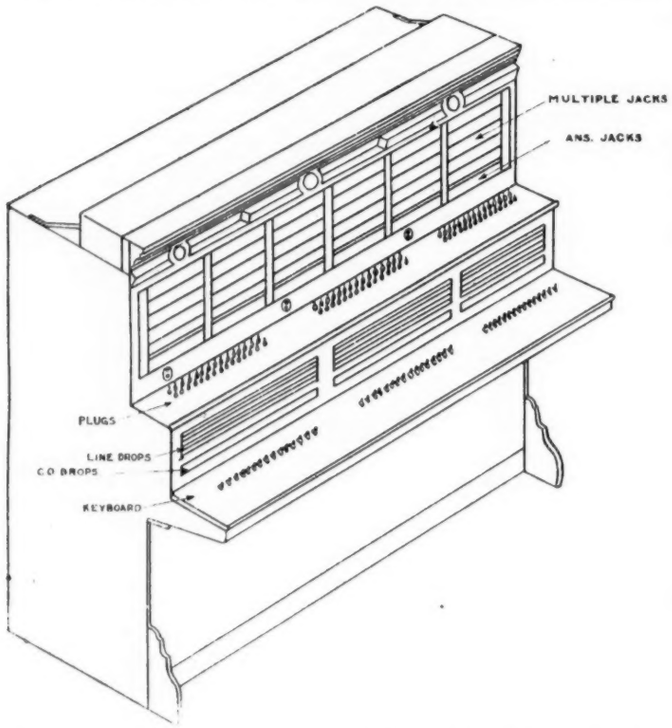


FIG. 1.—SERIES MAGNETO BOARD. DROPS RESTORED BY HAND AND PLACED SEPARATE FROM JACKS AND CORDS.

and has to exert no brain-power in tracing the relation between the signal and its corresponding jack or cord. The difference in effect between the modern arrangement of directly associating the signals with their corresponding jacks and cords and the old arrangement of placing the signals in a separate part of the board from that occupied by the jacks and cords is something akin to the difference between a telegram in plain language and one in code. In the one case the meaning of the signal flashes instantly to the brain of the operator, and in the other case a certain effort, and a certain interval of time, are required for translating the meaning of the signal. The automatic working of lamp signals is of much wider range than that of electro-magnetic signals. We had self-effacing, or automatically restored, indicators before lamp signals were introduced. But the self-restoring indicator had but two positions—only two words in its vocabulary, so to speak. The lamp signal has several; it may be alight or out, corresponding to the down and up positions of the indicator, but it may also flash, and it may be made to flash at different rates of speed, easily recognizable. Therefore, apart altogether from the fact that it is much more easy to apply to lamps distinctive marks indicating different classes of service than it is to apply such marks to indicators, the lamp signal is able to convey a greater number of meanings as a working signal than an indicator. Finally, the more assertive and positive signal given by a lamp as compared with an indicator is due to a simple physical fact—the great sensitiveness of the eye to light. The glowing of a lamp signal instantly attracts attention, no matter at what angle the lamp may be relative to the eye, and in many cases the lamp is seen instantaneously where a fallen drop would be unnoticed for several seconds. The lamp is seen out of the corner of the eye, so to speak, whereas an indicator must be more directly in the range of vision. The diagrams, Figs. 1, 2 and 3, illustrate the relative positions of the signals and jacks in the three chief types of multiple switchboard.

Perhaps the most striking improvement in operating resulting from the use of lamp signals and the supply of energy from a central source is automatic supervision. In the older systems of working, as has already been said, the indefiniteness and unreliability of the signals made it necessary, in order to reduce as far as possible the percentage of error, that the operator should give each connection a certain amount of supervision. This supervision was directed to ascertaining that the two subscribers had got together all right, and later, in the many cases where the disconnection signal was not given, of ascertaining whether the subscribers had finished talking and the lines could be disconnected. This supervision demanded a certain amount of the operator's time on each connection in excess of the time actually required for the operation of the connection. In the modern switchboard the exact condition of the two subscribers' lines connected is shown by the state of the

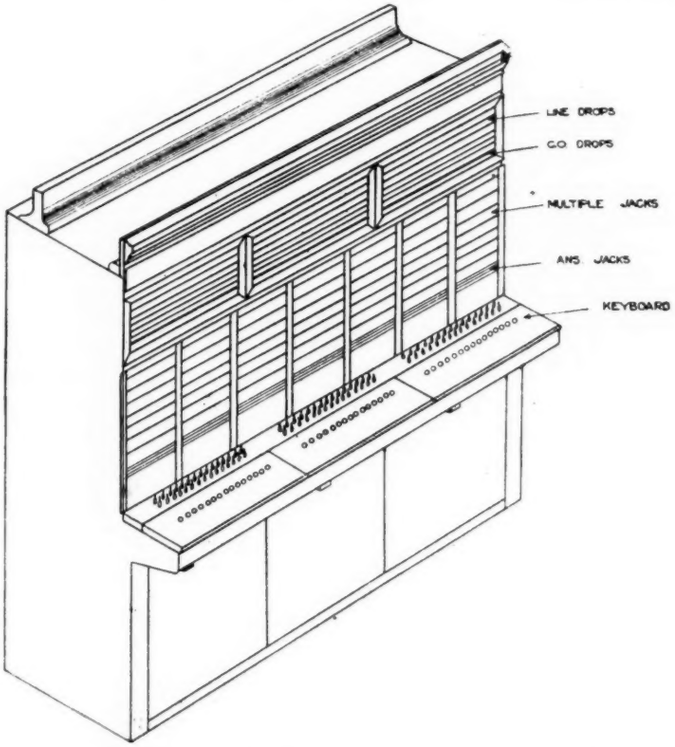


FIG. 2.—BRIDGING MAGNETO BOARD. SELF-RESTORING DROPS, PLACED APART FROM JACKS AND CORDS.

two supervisory lamps associated with the connecting cords. By the automatic working of these two signals the operator knows when the called subscriber answers, she knows when one subscriber hangs up and the other does not; she knows if either subscriber wants her to come in on the line, and finally she knows when the two have hung up. The operator sees these various conditions of the line by the action of the two lamps, and she requires to do no direct supervision. If either subscriber desires to attract her attention he flashes one of the supervisory lamps, by moving his switch-hook up and down, and it is only on this signal that the operator goes into the circuit. The automatic super-

vision and the automatic and definite disconnection signal afforded by the double supervisory signals constitute an immense advance in the means of handling telephone traffic.

In the working of junction lines—a branch of the operating which is of the highest importance in large systems, since the greater proportion of the traffic passes over the junctions—great improvements have been effected by modern apparatus and methods. The use of lamp signals affords what was lacking before, a positive disconnection signal at the incoming end of the junction. The absence of such a signal was formerly responsible for many operating errors and for much extra work and waste of time. The existence of the supervisory lamp on the cord at the answering position enables the incoming junction operator to signal back automatically to the answering operator if the line wanted is engaged or out of order.

In the accompanying diagrams the average time occupied in the various steps of a connection between one direct line and another is shown for magneto working and for working with modern standard equipment.

The explanation of the diagrams is as follows:

Zero being the starting-point at which the subscriber rings or takes his telephone off the hook, A is the point at which the operator has plugged in and answered, B the point at which she has taken and repeated the number, C the point at which she has tested the line wanted, plugged in and started to ring, and D the point at which the called subscriber answers. From D to E is the conversation, which

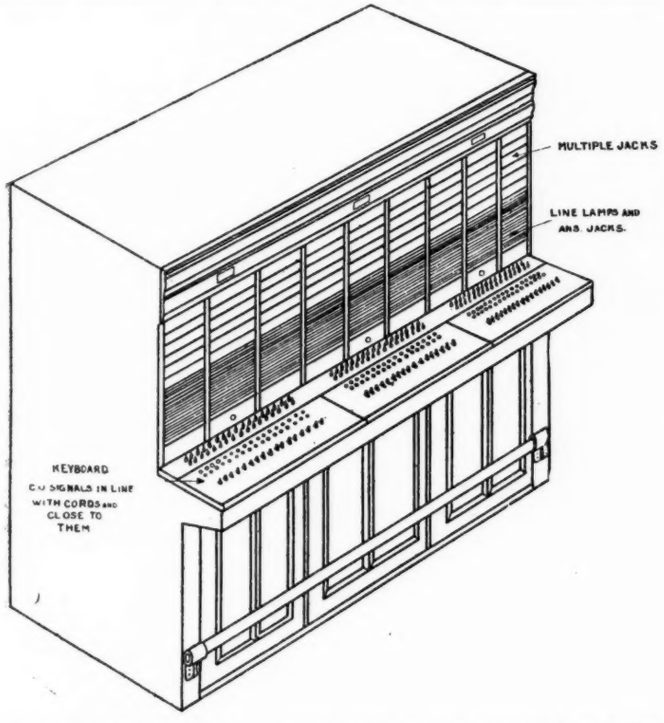


FIG. 3.—RELAY BOARD. AUTOMATIC LAMP SIGNALS PLACED IMMEDIATELY ADJACENT TO JACKS AND CORDS.

is not shown on the diagrams, and F indicates the point at which the lines are disconnected after the end of the conversation at E. It will be seen that the total time spent in operating a local connection with magneto working was 14.77 seconds from the beginning of the call to the moment when the operator began to ring the called subscriber, and 17.1 seconds from the end of the conversation to the moment when the operator disconnected the two cords. In the diagrams relating to junction calls the step B-C includes the time occupied by the answering operator in speaking by call-wire to the junction operator and getting from her assignment of a junction and in plugging into the junction, and the time occupied by the junction operator in testing the line called for, plugging in and starting to ring; during the step B-C on junction connections work is being done simultaneously by the two operators at either end of the junction line.

There are several noticeable points in these diagrams. I should say first of all that the times given are the averages of many thousands of stop-watch observations made by trained observers with special signaling appliances attached to the lines under observation, and the figures indicate with great accuracy the actual average service received by the public. The service observed is that of New York city, where the working was at one time uniformly magneto,

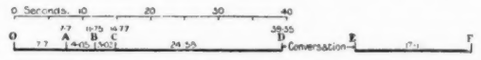


FIG. 4.—PROGRESS OF LOCAL CONNECTION, MAGNETO SYSTEM.

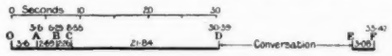


FIG. 5.—PROGRESS OF LOCAL CONNECTION, RELAY SYSTEM.

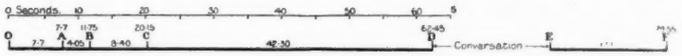


FIG. 6.—PROGRESS OF JUNCTION CONNECTION, MAGNETO SYSTEM.

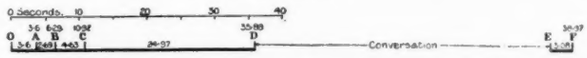


FIG. 7.—PROGRESS OF JUNCTION CONNECTION, RELAY SYSTEM.

O—Beginning of call. Subscriber rings (Magneto) or takes down Telephone (Relay). A—Operator plugs in and answers. B—Operator takes number and repeats it. C—Operator tests line called for, plugs in and starts ringing. In Junction Connections step B-C includes assignment of Junction by Junction Operator, plugging into Junction by Answering Operator, and testing, plugging in and starting ringing by Junction Operator. D—Called Subscriber answers. E—End of Conversation (duration of conversation is not shown to scale). F—Operator takes connection down.

though with various types of equipment at different central offices, and is now and has been for the past three years uniformly relay, or common battery, with practically identical equipment at all central offices.

Taking the magneto service, the average time of disconnection, 17.1 seconds, seems long. The explanation is that on many occasions no disconnection signal was received by the operator, either because the subscribers failed to "ring-off," or because the signal failed to work. In such cases the operator would only learn that conversation had actually finished by supervision—listening-in. Such a measure being necessary on a large proportion of connections, a high average figure for the disconnection necessarily resulted. Similar conditions would be found on any magneto system to-day where the subscribers have not been rigorously trained to "ring-off."

A curious feature of the service with magneto working is the much longer time taken to complete junction connections, and the diagrams show that the called subscriber's answer was apparently eighteen seconds slower on junction than on local connections. As a matter of fact the diagrams do the called subscriber a slight injustice; he really answers the call somewhat more quickly than the diagrams show. The explanation is that the operations on each connection are not strictly consecutive, as an operator usually deals with several connections at once. This results in breaking the strict continuity of the operations on a given connection; there occur short gaps in the train of operations on each connection, during which intervals operations on other connections are being performed. For the sake of clearness I have not attempted to illustrate this interweaving of operations, but have shown the various steps as if they were performed always consecutively. The natural tendency of operators is to complete local connections first; this slightly increases the gaps in handling trunk connections, and so makes the total time of operating, and apparent time of subscriber's answer, longer on junction connections.

The really striking features of the diagrams, however,

are the great improvements in efficiency resulting from uniform relay working. It is seen that the local connection is operated in 8.55 seconds, as against 14.75 seconds, and the junction connection in 10.92 seconds as against 20.15 seconds, while the delay in disconnection is reduced from 17.1 seconds to 3.08 seconds, a substantial and important gain due entirely to the use of double supervisory signals.

To show more clearly the gain in efficiency of operating with modern apparatus I have plotted in Figs. 8 and 9, the total time occupied in operating each class of connection under magneto and relay working, including supervision and allowing five seconds for ringing, but eliminating the called subscriber's delay in answering, and, of course, the conversation. These diagrams show a very striking contrast between the results under old and modern methods. It is seen that the time spent in operating the average connection with standard apparatus is just a third of the time occupied with magneto apparatus; in junction connections the gain is even greater, the time spent in operating the average connection with standard apparatus being less than a quarter the average time with magneto apparatus.

These figures indicate that with the apparatus of to-day the operator should be able to do from three to four times the amount of useful work, that is, handle from three to four times the number of calls in a day that she was able to cope with ten or twelve years ago. It is impossible to give quantative results of any exactitude, for a variety of reasons. The nature of the telephone call itself varies in different places; in some places there is hardly any junction work and the business is nearly all flat rate, making the average connection a very simple operation, while in other places there is much junction work, and a large proportion of the traffic consists of message rate calls, party line calls, call-office calls, and suburban and long-distance calls, which all have their quota of complication and extra work. Moreover, with the great increase in the use of the telephone during the past ten years there has arisen a corresponding increase in the fluctuation of the traffic—the busy hour is busier, the sudden rushes are more frequent and more accentuated—and it is the busy hour which, to a great extent, regulates the day's work of the operator in large exchanges, and the day's work of the junction line in large systems.

For all these reasons it is impossible to establish exact comparisons of quantative results to prove that the whole gain in efficiency and economy indicated by these diagrams has really been utilized. That a large part has is unquestionable. One instance that has come under my notice, illustrating a very substantial gain in economy, may be mentioned; it is an exchange which formerly contained a magneto equipment for 5,200 lines. The present switchboard equipment of standard apparatus is contained in a room of exactly the same size as the former room, indeed, built over it, and has a capacity of 9,600 lines. To show how difficult it is to make exact comparisons, I may mention that in the present switchboard the answering positions occupy about three-quarters of the space formerly occupied by the answering positions of the old board, whereas the incoming junction positions, though they are more economical, occupy more than twice the space formerly required for incoming junctions, so great has been the increase in the amount of junction traffic.

A saving in time in operating the average connection results in a more economical use of the plant in two ways: first, as the operator can handle more traffic in a day more lines can be terminated at a position, which means, as I have just indicated, a shorter switchboard for a given number of lines, with many attendant economies; and second, as the plant is used for a less amount of time on each average connection, the daily traffic-carrying capacity of the plant is increased. This has a direct effect on the economy of a very important part of any large system—the junction lines and their necessary switchboard equipment. It has also an effect in reducing the "engaged" trouble—that bugbear of all busy telephone systems. In Fig. 9 the diagrams illustrate the total time that the plant is employed in the unproductive part of the connection, the time that the plant is in use from the call to the second subscriber's answer, and from the end of the conversation to the disconnection. It will be seen that on the local connection the operating period on each connection has been reduced from 56.45 seconds to 33.47 seconds, a gain of 22.98 seconds, and from 79.55 to 38.97, a gain of 40.58 seconds on junction connections. Allowing an average of 120 seconds for the conversation, the result of shortening the time during which the plant is tied up on each connection by 40 seconds is an increase of twenty-five per cent in the traffic-carrying capacity of the junction plant.

IMPORTANCE OF TRAFFIC STUDY.

It must not be imagined that the great increase of efficiency shown by these diagrams is due solely and entirely

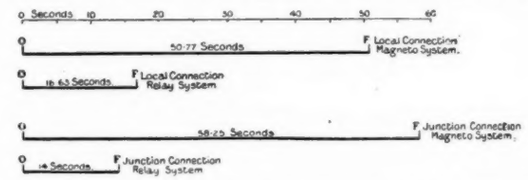

0 Seconds 10 20 30 40 50 60
50.77 Seconds
F Local Connection Magneto System.
18.63 Seconds
F Local Connection Relay System
58.29 Seconds
F Junction Connection Magneto System.
14 Seconds
F Junction Connection Relay System

FIG. 8.—TOTAL OPERATING TIME PER CONNECTION, INCLUDING SUPERVISION AND RINGING.

to improved methods of signaling and improved apparatus generally. It is also due to more efficient operating and a more thorough study of the minutest details involved in the handling of telephone traffic. It remains true, however, that the improved apparatus is the fundamental cause of the increased efficiency, for with the standard apparatus of to-day we not only get signals having definite meanings, and so eliminate a fundamental defect from telephone switchboards, but we get absolute uniformity of working, and so are able to train operators more effectively and more systematically. We give the operators better tools to work with, tools which involve less mental labor and less physical labor, and we are able better to teach the operators how to use those tools most effectively, both because the whole group of apparatus has become more scientific, and because the study of all the features of telephone traffic has become more scientific. The gain in efficiency of the telephone connection would be much less than it is if the introduction of

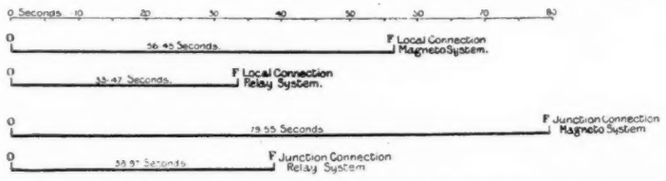

0 Seconds 10 20 30 40 50 60 70 80
56.45 Seconds
F Local Connection Magneto System.
33.47 Seconds
F Local Connection Relay System.
79.55 Seconds
F Junction Connection Magneto System
38.97 Seconds
F Junction Connection Relay System

FIG. 9.—TOTAL TIME PLANT IS IN USE PER CONNECTION, EXCLUSIVE OF CONVERSATION.

accurate and automatic apparatus had not been accompanied by the adoption of systematic methods of instructing and training operators, of supervising their work and of continuously observing and testing the service. The preliminary training of operators is a most important point in a large and complicated system. In the old days, with a variety of types of equipment in use in the different exchanges, it was impracticable to establish a really effective training school. To-day, with uniform equipment in all exchanges, a training school where the embryo operator learns her work by the practical manipulation of the same appliances as she will handle in the regular exchange is a most natural institution. At such a training school more progress is made in a month in turning out an efficient oper-

ator than was formerly made in three months by the method of letting learners listen-in at a working position and gradually pick up the work by experiment. In any large system a training school is absolutely necessary for teaching operators the general methods of the work, the proper terms to use, the geography of the exchange districts, and so forth, but the course is relatively ineffective unless it includes practice with the actual appliances the operators are to handle, and practice in answering and completing calls; thorough practice of this kind is difficult to give unless the exchanges have a uniform type of equipment.

The general supervision of the service becomes much more effective with standard apparatus, because the lamp signals are much more easily observable by the supervisors than indicators are. Standing behind the operators at a relay switchboard one can practically follow every movement of the subscribers' telephones; a line signal unanswered or a pair of supervisory signals unattended to glare insistently until the operations demanded are performed. The supervisor's attention is instantly called to any unusual rush of calls, to any difficulty or delay.

The constant observation of the traffic is the measure which has contributed most to the effective use of modern apparatus, and to the attainment of a high standard of efficiency and accuracy in the operation of a large daily volume of telephone traffic. It is only by making continuous tests on a certain proportion of the daily traffic; noting not only the time of every step, but the method and manner of conducting every part of the operation, that sufficient information can be gained of operations involving so much detail to enable defective methods of operating to be eliminated or checked, and suggestions to be evolved tending to a general increase of efficiency.

Some idea of the complexity of telephone traffic may be had from the fact that the form for recording these service observations contains forty-two columns, each with its appropriate heading. An entry in each of these columns would not be made for a single call, but the test of one connection might require notes in a fair proportion of the columns, and even if but very few entries are made, each test or series of observations contributes its quota of information relative to the speed, the accuracy, and the general efficiency of the service. To set all these observations out on a diagram would hardly be interesting, and I will only say that the observations give the time, in seconds and fifths, of every step of the connection, the result of every connection, whether effective or ineffective, and if ineffective from what cause—engaged, don't answer, cut-off, wrong number, subscriber left instrument, etc.—the mistakes and omissions of the operator or the subscriber, for even telephone subscribers are known sometimes to make mistakes—and in short, every ordinary vicissitude that the telephone connection is subject to. The information gained by a large number of tests of this kind, in which observation is made of every detail in the brief history of the telephone connection, is of enormous value in bringing to light the weak spots in the service, whether they be due to defects or faults in the plant, to slowness, inattention, lack of co-operation or lack of method, or erroneous methods on the part of the operators. I hardly like to hint that there may be sometimes lack of method or erroneous methods on the part of the users of the service, who may thus contribute to the errors and delays which sometimes occur in the daily stream of telephonic traffic; but if there be, continuous service observations will reveal them, and measures may then be taken to suggest such reforms as seem advisable.

To secure speedy and accurate operation of the vast volume of traffic which flows daily through a large telephone system requires first, that the apparatus used have signals of definite meaning, that the working of the apparatus be largely automatic, and that the apparatus be of uniform type throughout the system; second, that the operators be thoroughly trained in the manipulation of the apparatus and in the methods of dealing with all varieties of calls before being entrusted with the conduct of actual traffic; third, that the operators be continuously trained to active co-operation with each other, so as to produce general efficiency, and to accuracy and method in every detail; fourth, that a constant study be maintained of the actual conduct of the traffic, directed to the improvement of the standards of accuracy and speed.

DISCUSSION.

J. GAVEY: There are several gentlemen here who are much more closely in touch than I am with the actual details of traffic such as are illustrated in the paper and the diagrams, so that, with your permission, I propose to refer more particularly to the relative capital expenditure and working expenses when comparing an old type of switchboard with a modern well-designed and up-to-date exchange. To do this, I propose briefly to refer to the elementary operations involved in placing two subscribers in communication, first on an ordinary magneto exchange, and secondly on an automatic signaling exchange, one of which has been described by the author as a relay board. A subscriber on a magneto exchange first calls attention by turning the handle of a small magneto generator. At the exchange, a shutter, generally placed at the top of the switchboard, falls, and the operator goes through the mental process of connecting in her mind the position of the shutter and the corresponding position of the jack on which the calling subscriber's line is terminated. This done, she plugs in and says, "Number, please." She then tests the line of the wanted subscriber and rings him up, probably waiting in circuit for a brief period to see if he answers; if not, she turns her attention to another call; then comes in circuit on the first line and rings up again. If the subscriber does not answer speedily, she may have to do this on two or three occasions, thus wasting a lot of her time, because she has no other means of ascertaining whether the two subscribers are in communication except by listening to their talk. Again, there is the question of the clearing-out signal. When the conversation is over the subscribers have to ring off; a shutter in the cord circuit is dropped, and the operator then severs the connection; but as so many subscribers fail to ring off she has to come in circuit when any given two lines have been engaged for a lengthy period to ascertain whether the subscribers have finished their talk. Thus, in the course of a day's work a great deal of time is wasted. On the other hand, with the automatic signaling, the operator knows absolutely, by glancing at the signals, whatever is going on. She answers the call, which is indicated by a lamp close to the corresponding jack, she plugs in without hesitation, tests the line, gives a brief ring, and goes on with her other business; the supervisory lamp on the wanted subscriber's side is lighted, and it remains lighted as long as the subscriber does not answer.

From time to time the operator gives a brief ring, but she does not waste her time by coming in circuit, she goes on with the remainder of her business. In the same way, when the conversation is finished, the mere hanging up of the telephones lights at the extremities of the circuits the two supervisory lamps, and that is an absolute order to disconnect. The difference in the two systems results in this. Unquestionably one operator, with a suitably designed automatic signaling system, can work double the number of subscribers that she can on a magneto system. Consider what that means. The cost of a section in a large multiple board with, say, 12,000 or 14,000 subscribers on it, may run to something like £1,000. If the design of a board admits of one operator doing twice the amount of work, she does more than make two blades of grass grow where one did before, because a saving of £1,000 is effected on every section: there is the saving on the floor space—a very ma-

terial item in a modern city—and the saving in the operating expenses, because it is possible to work a large exchange with half the number of operators. Then, again, that is not the sole measure of economy. Some reference has been made to the economy in working junction circuits. In a large exchange system, like that in London, from twenty per cent to twenty-five per cent of the total number of lines used are devoted to junction purposes; in other words, there is one junction line for, say, every four subscribers; and as the junction lines are much longer as a rule than the subscribers' lines, it may be assumed that thirty per cent, perhaps, as a rough figure, of the total mileage of such an exchange system is devoted to junction purposes. Mr. Webb, in his paper, shows that the junction connection through a magneto system occupies 79.59 seconds as against 38.97 sections on a relay system. If thirty per cent or forty per cent of the capital is invested in junction lines, and if a saving, say, of fifteen per cent of the total capital expenditure on copper buried in the streets can be effected, a remarkable measure of economy is achieved. Therefore, a properly designed system means that the ideal conditions are obtained, viz.: great economy, and, as shown by these figures, greatly improved efficiency.

W. W. Cook: Mr. Webb has enumerated the various improvements which have contributed to and resulted in the excellence of the modern telephone switchboard; but I do not think he has brought out clearly the relative importance of those improvements. In my opinion the real dividing line between the periods mentioned is the introduction of double supervisory signals. I am quite sure that Mr. Webb himself appreciates the importance of this point, but I am afraid that the casual reader of the paper might imagine that this was in some way the result of the introduction of lamp signals, and could not have been attained without their aid, and in support of this view the beginning of the ——— paragraph on page —— might be quoted. The word "perhaps" might have been omitted, but I think the misleading sentence is "resulting from the use of lamp signals, etc." It is quite true that the double supervisory system came after the introduction of lamp signals, but I submit there is no necessary connection between the two, and that the double supervisory signal is the all-important fact. I do not wish in any way to minimize the importance of lamp signals; owing to that quality which Mr. Webb happily describes as their assertiveness, their reliability, and their compactness, they are indispensable in large switchboards where heavy traffic has to be dealt with; but in discussing principles I think a distinction ought to be drawn between signals and indicators. The distinction, which is somewhat arbitrary but fairly well recognized, is that an indicator cannot be under continuous control from one source. It may be dropped or it may be restored, but only after some other agency has put it in a position to respond to the next action. A signal, on the other hand, is actuated by a current in the same way as an indicator or a lamp, but like the lamp and unlike the indicator it automatically regains its normal position directly the current ceases. The advantage the lamp or the signal has over the indicator is that either of them can show continuously the state of affairs, while the indicator can only show that certain acts have been done, and this is only true when the two parties, *i. e.*, the subscriber and the operator, acting independently and with imperfect knowledge of the other's doings, both work in harmony. This continuous knowledge is not, however, the whole secret of the effectiveness of the modern supervisory signals; what is wanted is that an operator shall have independent and continuous knowledge of what is happening on each side of the cord circuit, and this is what is attained by and only attained by the double supervisory signal. The weakness of the ring-off indicator was not, as might be imagined from the paper, due to the fact that it failed to work when required. It was, and still is, a very reliable piece of apparatus, but there are three reasons why it was not satisfactory. One, and the most important, was that it had to be worked by the subscriber, who had to perform a deliberate act that had no necessary connection with the work in hand. Secondly, it did not give continuous supervision; and, thirdly, it did not give independent knowledge of the state of each side of the circuit. A great many attempts were made to obviate these disadvantages, but one or other was always retained until the common battery system was evolved, and it is really astonishing that even now systems are defended and even advocated which infringe one or more of these conditions. The real aim of course is to enable the operator effectively to supervise without listening in at all, and a system is good or bad according to how far this is effected. I have some New York figures on this question of listening in which are very instructive, and might very well have been included in the paper. Under the magneto system, in both local and junction calls, an operator had to go into circuit on an average five and a half times. The time occupied in so doing in the case of a local call was fourteen seconds, and in the case of a junction call sixteen seconds. With the introduction of the common battery system this disappeared entirely, and not only is the time saved, but what is more, the integrity of the connection is preserved. Claims are often made for systems that an operator cannot possibly listen in. Even if this claim were well founded, as it is not, it would be attained at the expense of good service, but really the best method of insuring that an operator will not listen in is to obviate the necessity for it. An operator must listen in unless the signals tell her exactly what is happening without doing so, and if you do not provide her with proper means of doing it she will find other means.

The present system of supervisory signals meets the conditions I have mentioned almost perfectly, and, if it were worth while, they could be made still more perfect by the addition of a third lamp, which would only come into play when the subscriber replied. The only possible uncertainty now is whether the calling lamp being alight means the subscriber has not replied or whether he has answered and gone away; but in practice the operator has no difficulty in distinguishing between the two.

J. E. Kingsbury: I should like to join those who have preceded me in thanking the author for bringing this subject before the institution. I think it would not be possible to emphasize more than he has already done the importance of traffic study in designing and arranging telephonic apparatus. It may be well to consider for one moment what the extent of that traffic is. The word "traffic" usually implies some element of bustle and noise, something that can be seen and heard. The Thames, when it was used for local traffic, was called "the silent highway." It may seem something of a "bull" to describe a telephone line carrying conversation as a "silent" highway, but it is so except to the two people who are talking. I estimate that, in the ordinary way of counting messages, there must be some five million messages daily transmitted over those silent highways in the United Kingdom. It is obvious that the organizing of that traffic for the greatest convenience of the subscribers and for the highest economy in service must need an immense amount of study. Mr. Webb has drawn our attention to the importance of that study. Perhaps it might seem that he has not gone quite far enough in directing the course of the study. To some extent he may remind us of having suggested the importance of the study of diet without having indicated the sort of diet that we should indulge in. I have no doubt Mr. Webb would tell me in reply that that is because different constitutions require different diet, and that is true. There is probably no telephonic service which is exactly like any other telephonic service. Each requires to be studied on its merits. But there are, at the same time, certain broad lines covering all to which reference might

have been made. A point of economy already referred to by Mr. Gavey may be emphasized in regard to the switchboard by stating that except the line circuit, everything on the switchboard depends upon the traffic. The only fixed item is the apparatus connected to the lines, which must be there whether the traffic is large or small. If the traffic is large or ill-regulated, all the rest of the switchboard must be more costly. If the study is carefully carried out, and the best results obtained from it, then the economy of the switchboard apparatus may be largely augmented. That, of course, is perfectly clearly understood by all telephone engineers concerned with large systems. The traffic is forced upon their notice; though unseen by the public, it is very much in evidence to them; and that is one of the points, as Mr. Webb has stated in his paper, which it is difficult to bring before them as something new. But it is not all telephone engineers who have a large system under their control, and who have an opportunity of extensive study of traffic problems. To them I am sure Mr. Webb's paper will be of considerable value, and they will be enabled to utilize in the development of their systems much that he has brought before our notice.

If I am not taking up your time unduly, there are one or two points on the evolution of the switchboard I should like to refer to. Mr. Webb has laid stress upon the value of the answering jack being adjacent to the lamp signal. That is unquestionable; it is an enormous advantage, but I should like at the same time to point out that it is not a modern discovery. Before any of the types of switchboard which have been shown here were in existence, it was not unusual to place the jack—there was only one jack in those days—quite close to the indicator. It was only altered because of the mechanical conditions. It was obviously impossible to have numerous cords crossing and recrossing the indicator field. So long as the indicator was a mechanical indicator it was not possible to place the jack and the indicator close together on a large switchboard. When, however, the indicator was divided into two parts, advantage being taken of the electrical long arm to let a lamp replace merely the shutter portion, the mechanical features could be placed somewhere else. In this way a large space on the face of the switchboard was available for operating, and the distinct benefit of the jack and the signal being close together could be taken advantage of. There are several other points in the paper to which reference might be made, but there are many present here who have made a special study of telephone traffic problems, whose remarks we should like to hear.

S. J. Goddard: I wish to associate myself with Mr. Kingsbury in what he has said in regard to the paper. Mr. Webb has told us a good deal about the switchboards, but he has not told us so much about the traffic as he could have done, and as we wish he had done. I take it the problem the telephone engineer has to face is very much the same as that which the railway engineer has to face: he has to make arrangements for taking the largest volume of traffic from one place to another at the smallest cost, in the shortest time, with the greatest efficiency, and with the least waste; and this can only be done by constant study of the traffic in its ever-varying phases. I am going to suggest, if I may, four points to which special attention should be directed. First, the number of calls made by the individual subscriber. Unless we have this information, and accurately, it is impossible to distribute the work among the operators as it should be distributed, so as to keep them all busy at the busiest time, and at the same time prevent any operator being overloaded at any time. The second point is the variation of traffic during the hours of the day. It is only by studying this that it is possible to have an adequate operating staff when your traffic demands it. The third point is the study of the junction traffic. It is of the utmost importance that there should always be a supply of junctions available for all emergencies, and unless we are constantly studying the way the junction traffic flows we may be landed at some time in the position of having a lot of traffic, and not having the means of carrying it. It is necessary, from time to time, to form an intelligent anticipation of how the traffic is going to develop, so that we may be able to provide the requisite junction circuits to carry the traffic when it arises. The fourth question is the methods of dealing with the calls by operators and subscribers. It is only by constantly observing the operators' methods that we are able to locate their faults, and get the operators into the best methods of handling the traffic. Incidentally a close observation of the operating enables us to try to induce subscribers to comply with the rules (which they often do not do) to use their telephones, their voices, and to moderate their language in such a way as will not break down the operating. There is another point in connection with the traffic question which is of extreme importance, *i. e.*, the great difficulty which occurs in actually counting the calls made and following them through to their destination. You can count trucks as they go by on a railway, but if you count calls as they come over a telephone system hour by hour you are very apt to dislocate the traffic entirely. The National Telephone Company pass over the London system every day something like half a million calls, and any inquiry that is made, unless it is done very carefully, will tend to dislocate some portion of the traffic, with a disastrous result. So that before the telephone engineer can study the traffic, he has first to study the means by which he can arrive at the facts on which he is going to base his conclusions.

D. H. Kennedy: Mr. Webb has given us some very interesting figures as to the average times taken by various traffic operations. Since reading his most admirable paper I thought it would be interesting to have, as some means of comparison, figures showing the minimum times which could be obtained when experiments were made under conditions which allowed of the operator doing the required operations in the minimum time and when she knew she was being tested. I took a large number of observations with a stop-watch, and I found it was possible, under the very best conditions and with the smartest operators, to complete the operation marked *A*, that is, the operation of observing the lamp and replying to the subscriber, in one second. I should like to say something about the slide (Fig. 3) showing the relay board.

A study of the conditions in the way I have described led to one or two interesting points. If you imagine that the operator is at the first position on the left you will see she has in front of her three panels. At the Western Exchange, where these experiments were made, each of the three panels contained sixty lamps, and the operator was attending to a total of 178 subscribers. You will notice that in the panel on the left there is no pilot lamp. In the Post Office system a pilot lamp is provided for each panel. In the course of my experiment it was necessary to put out of use the pilot lamps. I found that this immediately caused a slowing of the operation—that whereas with the benefit of the three pilot lamps, which located the call into one of the three panels the operator could do the operation in one second, without the pilot lamps it took a minimum of 1.9 seconds. Further, as is somewhat natural, the subscribers in the panel on the right hand could be dealt with more quickly than those in the middle or the left, speaking of a right-handed operator. In conducting these tests the psychological aspect of the question presented itself, namely, how quick was it possible for the human mind to act? It appeared that it was possible for four operations to be carried through in the short space of one second. In using the stop-watch method of timing I had to observe the lamp light at the same time as the operator; and as the operator was doubtless more accustomed to that operation her mind

possibly worked quicker than mine. So I thought it would be possible to time the operation automatically, and after a little thought I arranged for a Wheatstone receiver to be joined in circuit to one panel. The center panel, taking sixty subscribers, was connected at a Wheatstone circuit in such a way that, when a subscriber called, a current passed through the Wheatstone receiver, which immediately began to mark; then, by adjusting the receiver, so that the slip ran out at one and one-half inches per second, it was possible to subsequently measure the length of the time during which the ink wheel had been down. In that way an accurate timing arrangement was secured, and it was easy to measure to tenths of a second. Subsequently, after dismissing the ideas of minimum times, I applied the arrangement to an ordinary operator who was unaware that she was being tested.

This morning, during one hour, and taking a middle position, which, of course, only takes one-third of the calls, and without the operator being aware that she was under test, I obtained a record of thirty consecutive calls which were dealt with in a total elapsed time of fifty-nine seconds, giving an average of less than two seconds for the operation of replying to the subscribers. That emphasizes the remarkable advantages which are due jointly to the use of the lamp as a signal and the close association of the lamp and the jack. I may say that I was able to institute a comparison, again referring to minima, between a board in the north of England, where we had the old system of jacks in one place and indicators in another. I remember making a large number of tests to find out what was the minimum time in which an operator could reply, and I was never able to get it below two seconds. So that, as Mr. Webb has stated, quicker operating has undoubtedly been obtained. It is interesting to know that his simile as to straight shooting was perhaps more apt than he realized, for in standing behind the operator I saw that if she did not get a bull's-eye on the jack right off it made two-fifths of a second difference. Then, again, endeavoring to get a minimum, I arranged for a number of junction calls to be got through with everybody on the *qui vive;* and we found it possible, after some few attempts, to get a junction call completed, that is, counting from the instant that the calling subscriber lifts the receiver through the linking up of the junction (requiring the co-operation of the two operators), to the instant that the called subscriber answers—he also being on the *qui vive*—that operation was actually completed in seven and one-fifth seconds. You will perhaps realize more clearly what that means if I state that it involves altogether on the part of four individuals no less than sixteen mental operations all completed in seven and one-fifth seconds. One concluding remark. Mr. Webb makes some illuminating comments on the history of telephonic development, and divides it into two periods, one of sixteen years, which is practically the magneto period, and another of eight years, which I think we may call the relay period. That division involves, I think, more than is shown in the paper. I think you might also say that it is a division between a period of sixteen years, in which English telephone engineers took a fair share in the development, and the later period of eight years in which development has been almost entirely due to the inventive genius of our good friends in America. There must be a reason for it. What is the reason that has led to us here to-night discussing figures which come from New York? In the matter of cable design English engineers have held their own; in the matter of the design of telephone apparatus they have fallen sadly into arrears. It is not because they were not there at the beginning of the problem. For over twenty years the Post Office has had a system which contained within it the germs of many of the attributes of the common battery system. It had, for instance, automatic calling, automatic clearing, and other attributes which we see nowadays arranged in a better form, due to the work which has been done in America. I think it is a very good thing for us to discuss what has been the cause of this, and the obvious reply, after every consideration, is the difference in the conditions. Telephonic development in America has taken place under the stress and strain of competition; here what development there has been, has taken place under a monopoly. We have, of course, benefited in that we have moved slowly, and we are moving along the best lines, but I think it is a right and pertinent thing for us to suggest to the telephonic powers of this country that it is perhaps not beyond the wit of man to devise some system which will introduce for all telephone people in England that inducement and incentive to invention which appears under competitive conditions in America.

F. GILL: I understand this is the first paper we have had on telephone traffic at this institution; it is a very complex subject, and all telephone men are very glad indeed to see a paper on it. The figures which the author has given are those of New York, and they show an exceedingly high standard of service. New York, as is well known, is the Mecca of telephone men. The service there is wonderfully good; their methods of handling it, their engineering, they way they take care of the service at present, the way they are proposing to take care of the service in the future and the development in the future are all models. And, lastly, those responsible for the methods are an exceptionally able body of men. Last year, when I was in the States, I stayed some time at New York, and I am very much pleased indeed to be able to make that statement from my own experience. There is one statement in the paper which I would like to correct. Mr. Webb says: "The use of lamp signals affords what was lacking before, a positive disconnection signal at the incoming end of the junction." I want to make one little point for this country, namely, that the positive disconnection signal at the incoming end of the junction was in use in this country, roughly in 1891 or 1892, I am not quite sure which, but it was a long time before lamp signals. It was a moderate use, I admit.

There is one point I should like to refer to which is not mentioned in the paper, and that is the connection between rates and traffic. I am not clear, but I fancy that in New York, under the magneto system, the flat rate was very largely used. The study of traffic has demonstrated quite clearly that the ordinary method of charge for telephone service by a flat rate, that is, where for a fixed rental an unlimited number of calls may be originated, is hopelessly wrong. When a subscriber takes a telephone, what he requires is the service; he does not want a line and the instrument at the end of it. The service is made up of a great many things. Every call that a subscriber sends has a very real effect; it is not a purely fictitious effect, as some people imagine, but there is a real effect on the size and complexity of the exchange apparatus, the junction plant, and the staff employed. We find that when a subscriber pays a fixed sum and can send as many messages as he likes, he undoubtedly sends many messages which are what one might call frivolous—I do not want to quibble over the word, and I do not use it in any objectionable sense—but they are not serious messages, and those messages bring in an additional cost on the whole system. Therefore, the plant as a whole has by reason of these messages to be more costly than it ought to be. Mr. Webb has referred to the question of the bugbear of engaged or busy lines. In New York the number of cases in which "busy" is reported with regard to the subscribers' lines has fallen from twenty-three per cent to twelve and one-half per cent. That reduction is a good deal due to relay apparatus, and a good deal to the double supervision, but not all. To some very considerable extent it is due to the fact that people do not use the telephone unless they really want it, and to the fact that the measured rate encourages subscribers to have additional

lines as required, rather than to allow their lines to be so occupied that it is a matter of difficulty to find them disengaged; in London we find that "engaged" is reported on twenty-two per cent of the calls. Again, we find that the average calls per direct line in New York are nine per day; in London they are 11.3 per day, that is to say, the London line is loaded roughly twenty-five per cent more than the New York line. The plant has to carry that extra load, and to that extent it is a more expensive plant than it ought to be. If that were removed, obviously, as Mr. Gavey has pointed out, the capital costs of the exchange would be reduced, and with the capital costs that which is the real criterion and the only criterion, the annual costs. If that twenty-five per cent were not imposed, the annual cost of working an exchange would be be roughly twelve per cent lower, and in addition there would be a very large reduction in the cost of the junction plant. It is no exaggeration to say that really sound engineering cannot be done in a large and busy area on the flat rate system. The cure for these evils is, of course, a measured service, by which the subscriber is charged for those messages which he sends. He gets a better service, he is only charged for what he sends, he does not send useless messages, and he does not pay for his office boy's messages. There is no more sense in charging a flat rate for telephone service than there is in charging a flat rate for the supply of electrical or any other energy.

I do not think sufficient stress has been laid upon the organization that is necessary to deal with the traffic. If you put in the same equipment as they have at New York you will not get the same results, you must do something more; you require to pay constant and most careful attention to minute details. I do not know of any other department in ordinary life where one requires the same instant attention as one does on the telephone. If you go into a shop, or into a postoffice, or a railway office you are content to wait your turn, but when you get on the telephone line you are very much more peremptory. I do not complain of that, because I think it operates to the good of the service, but it makes details very important. I should like to give some results which have been obtained in England on local calls. I do not for a moment put them up against the New York figures, because the conditions are entirely different; I simply give them for what they are worth. The first case is Nottingham, and I have selected it because at Nottingham they have the particular type of board which Mr. Webb referred to. From O to A, that is from the call to the answer, took 4.4 seconds, a little longer than New York, which is 3.6 seconds. At Hull, with another relay equipment, it took four seconds. I have not got exactly the same steps as those given in the paper, so I will take a big step from O to D. At Nottingham it was twenty-two seconds against 30.39 seconds at New York. I do not attach any importance to that reduction; it is possible that the subscribers in Nottingham answer a little more quickly and probably there are fewer residences on the exchange. At Hull, from O to D took 20.5 seconds; then, as regards disconnection, at Nottingham it took 4.7 and at Hull 3.8 seconds. These are not isolated tests, they are the results of many tests and may be taken as reliable. Isolated tests taken here and there are not of the least use; you might as well leave them alone. If you want to do any good at testing service you must test continuously.

Figure A shows some other results as regards the speed of answer. The seconds which are observed between the time the subscriber calls and the time the operator replies to him, are plotted against the percentage of calls which are answered within the time. Curve A and curve C are for exactly the same exchange; it happened to be a magneto exchange. The average time for A was 7.4 seconds. Then we did a little organizing; a new man was substituted, and he produced C with the same apparatus. C gives an average answer of 3.5 seconds; and you can see from the shape of the curve that it is not only very much better than A, but is also good in itself. B is taken on a standard relay equipment; that is also good. D is taken on another relay equipment; it is not quite what we call standard, but it is a relay equipment; it has double supervision and is a very fair type of board. The average time of D is 2.7 seconds; and you will see that ninety-nine per cent of the calls are answered in less than five seconds; while seventy-six per cent of the calls are answered in less than two and one-half seconds. All these curves are the results of a large number of tests.

The paper largely turns upon the use of common battery apparatus, and among the reasons why this type of apparatus has become so universal as practically to put out of account the construction of any other type of equipment, are that it enables one to simplify the subscriber's instrument and concentrate a highly specialized series of apparatus at the exchange where it can be properly looked after, and it permits the introduction of a large number of semi-automatic devices set in motion either by the operator or, unconsciously, by the subscriber. The co-operation on the part of the subscriber required by other systems is in fact too often absent, as illustrated by the author in the matter of speed of disconnection.

One sometimes hears the common battery system spoken about as if it were merely a particular kind of switchboard made by one manufacturer, and I have even seen it asserted

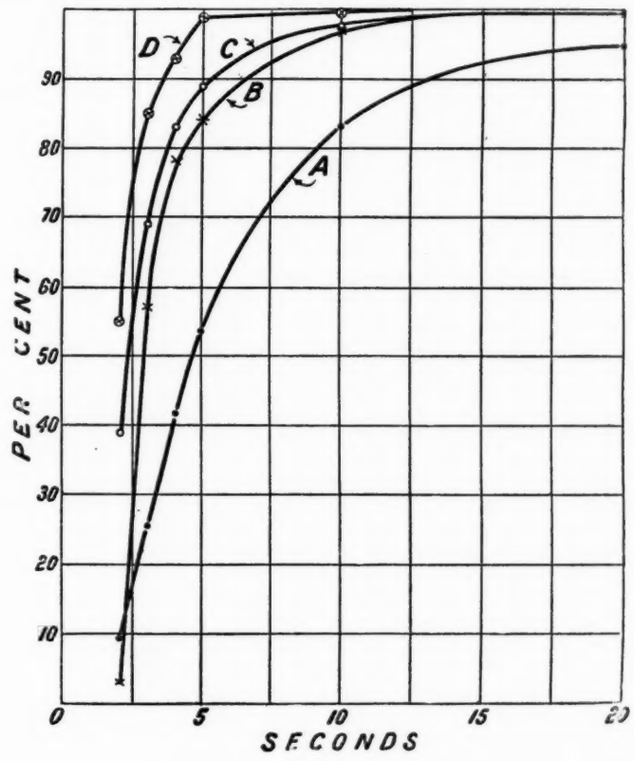


FIG. A.

that in the United States only the Bell companies use it. The official census lately published by the United States government shows that in December, 1902, there were in use by the Independent systems 481 common battery exchanges against 356 such exchanges in use by the Bell companies. No doubt those used by the Bell companies embraced the larger systems, such as New York, Chicago, Boston, etc., but these figures clearly indicate that the Independent engineers also appreciate the advantages to be derived from relay equipment. In this country the National Telephone Company is following the same course; apart from the provinces it has now in hand a large conversion scheme in London. During the last twelve months common battery exchanges have been opened at Holborn, London

Wall, North, and Sydenham; there are also in course of construction similar equipments for Hop, East, and Brixton, and there are others in various stages of preparatory work. The whole forms a scheme for complete relay working in London, but of course until the alterations are further on one cannot hope for the full benefits of the change.

G. F. PRESTON (*communicated*): Every practical telephone man will be in agreement with the writer of the paper, on the importance of a close study of traffic, and there can be no question but that the remarkable results of which Mr. Webb gives particulars are the fruit of such study.

It is presumed that these observations were taken entirely unknown to the switchroom staffs, and if this were the case there can be no doubt that the service was of a highly satisfactory character at common battery exchanges. Presumably in the exchanges from whence these records were derived there was a great number of message or toll rate subscribers, and that the calls made by them were recorded by the depression of a meter key. If the meter key was depressed in handling such calls, at what period of the call did the depression take place?

It would, further, be of much interest to telephone men to learn something of the load that was placed upon an A or subscriber's operator that permitted such a service to be given, namely, what was the maximum number of calls that an A operator was called upon to handle during the busiest hour of the day, and perhaps in giving this figure the percentage of junction calls could be stated? Inasmuch as approximately eighty per cent of the calls originated in the principal exchanges in New York and in London are junction calls, that is, have to be passed over a junction wire, it will be realized what an important part call or order wire working plays in telephone service.

It has long been understood that the New York authorities have paid great attention to this section of the work and endeavor to arrange the working of the order wire in such a manner that an A operator may have her demand instantly complied with, that is to say, the B operator is practically waiting to comply with the request of the A operator. Such being the case, what is the standard rate of call or order wire work in New York, *i. e.*, what is the number of demands passed over a call or order wire during the busiest hour of the day, and what number of junctions are generally controlled by one call wire between two busy exchanges? From these two figures it would be possible to determine the average number of calls passed over each junction wire during the busiest hour.

Another point in connection with junction working is, what number of call wires are placed at an A operator's disposal? Between two of the largest exchanges in New York there may exist eighty to one hundred junctions controlled by three or four call or order wires. Are the whole of these order wires repeated upon every A operator's position? In London at the present time, where we have three call wires working between two exchanges, it has been the practice to repeat each of these call-wires on all the A positions indicating those to be used by the operators by means of different colored keys. It would be interesting to know whether this is the practice in New York. Do they permit an operator to try one call-wire after another if she is unable to obtain the allotment of a junction at the first or second effort, or is the work so arranged that rarely, if ever, she has to pass to a second or third call-wire? It is understood that in the States there is a piece of apparatus for automatically recording the time taken by an operator in answering calls. If Mr. Webb knows anything of such apparatus it would be of much interest if he could give particulars of same.

B. S. COHEN (*communicated*): Mr. Webb's paper has, I think, very conclusively shown the vast superiority of the common battery or relay system from the traffic dealing point of view. There are, however, two points in connection with this system with respect to which considerable misapprehension exists. The first is with regard to the relative transmission efficiencies for local and common battery working.

It has been stated that common battery talking is not so efficient as local battery talking. While it is true that local battery transmission can be made more efficient than common battery, this only holds good when the local cells are in quite new condition, at their maximum E.M.F. and minimum internal resistance, but unfortunately the primary cell has a pretty steep deterioration slope. It may be of interest to mention that, as a result of careful tests taken all over the country, an average practical condition for cells used for telephone purposes has been arrived at, and that comparisons of local and common battery systems have been carried out using these average condition cells. Under these conditions the transmission efficiency for a common battery circuit has been actually found to be about seventeen per cent better than the corresponding local battery circuit for lines of between 50 and 350 ohms resistance.

The second point which it may be of interest to mention is that extensions are quite as workable with common battery as with the old systems, although there seems to be an impression to the contrary. Common battery extension working is only just beginning to be extensively applied in this country, but I venture to think that the methods adopted will be found to embody sounder engineering principles

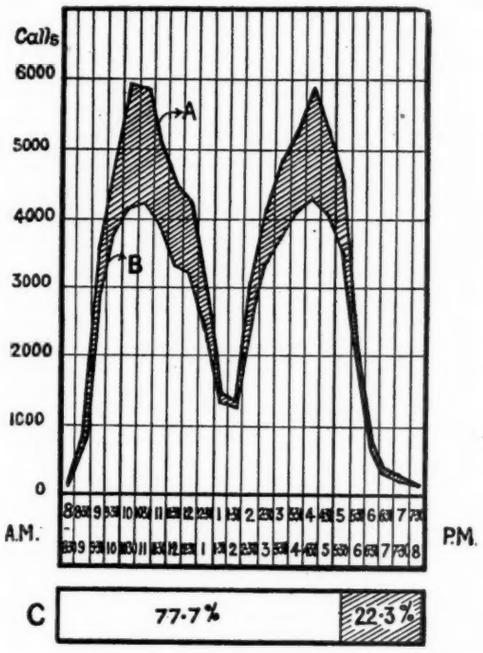


FIG. B.

and to give greater facilities than those used in connection with the old systems.

Mr. Webb mentions lamp flashing; it may perhaps be as well to state that in general practice there are only two flashing codes in use, one to flash the supervisory lamp in unison with the interrupted hum employed for engaged line signal and generally called the busy-back. The other is for flashing a supervisory signal to intimate to an operator that a subscriber she has connected has accepted a trunk call.

In connection with modern junction operating some of the factors not directly mentioned by Mr. Webb as increasing the efficiency may be pointed out. Firstly, the automatic ringing at the incoming or B end of the junctions. The

junction operator merely depresses the button momentarily and the machine ringing key does the rest.

Then there is the guard signal. The junction operators' disconnecting lamp is arranged so as to light if the A or local operator takes the junction before the B operator, and this obviates error, as if the A operator makes a mistake, the B operator can locate it. Also in the later junction circuits the automatic ringing is not started until the A operator plugs in, and this prevents the subscriber at the B end being brought to the telephone unnecessarily in the event of the A operator plugging into the wrong jack.

W. Napier (*communicated*): The subject selected by Mr. Webb is of the greatest possible interest to telephone engineers. It is only by a careful study of the details of telephone working that the requirements of this great organization can be ascertained and catered for. Important points which will have appealed to many are, first, absolutely reliable signals; secondly, effective supervisory signals which respond to the movements of both subscribers, and obviate the necessity for listening in on the part of the operator; thirdly, the simplest possible apparatus at the subscriber's end. Mr. Webb has touched very lightly on an essential point in the production of a good telephone service, viz., the absence of the reply, "Number engaged."

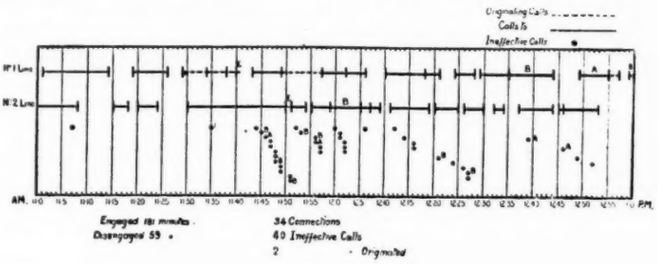


FIG. C.

This undoubtedly depends to a great extent upon reliable signals, the duration of connections, and the renting by subscribers of sufficient lines for their traffic. The question of rates, however, is one which must in the future receive fuller consideration. Taking the percentage of ineffective calls as twenty to twenty-three in a large exchange, it is readily seen that a large percentage of the costs for operating, apparatus, maintenance, etc., is involved, and that a reduction in this ineffective work will mean increased efficiency. The following observations were made in the Manchester exchange.

The loss in one day due to engaged lines is shown in Fig. B, A being the total calls, effective and ineffective, and B the effective calls only. The shaded portion therefore represents the waste, amounting to 22.3 per cent as shown on C.

Other tests proved that the percentage of engaged lines depends upon the rates and class of service to which the subscribers required contribute. The applications for flat rate subscribers averaged 22.9 per cent ineffective per day, while applications for message rate subscribers only averaged 11.4 per cent ineffective per day. Message rate subscribers pay per message and naturally control their traffic.

Fig. C illustrates a case in which two exchange lines are rented by a subscriber and are totally inadequate to carry the traffic, the system being one in which subscribers ring through and can maintain a connection, although both parties leave their telephones. The diagram is divided off into minutes (120), so that with two lines there are 240 available minutes. The horizontal lines represent the durations of the connections, the continuous lines being connections to the subscriber in question, and the dotted lines the calls originated. Each single dot represents an ineffective call due to both lines being engaged. A and B represent repeated calls and connections confined to two callers, A and B; E calls originated by the subscriber for engaged lines.

The number of ineffective calls for these two lines between 11:45 a. m. and 12:30 p. m. is specially noticeable, and demonstrates the disadvantages of rates and systems which enable callers to have connections of length and frequency which debar other callers and necessitate unproductive work. Up to the present this subscriber has not been induced to add to his lines, and the case is merely a sample of many in large exchanges. The relationship between traffic and rates is undoubted. There can be no doubt that traffic studies will pay the telephone engineer, and as millions of connections are involved the most minute detail is worth careful consideration.

Mr. Webb (*in reply*): I think there is very little reply to be made. I am very glad that nobody has quarreled seriously with the paper, or with any of the statements in it. I should like to say that I took the figures from New York for the purpose of making these comparisons, because it was the only large system that I was familiar with where there had been at one time uniform magneto equipment, and where there is to-day uniform relay equipment; it was not with any intention of parading the efficiency or smartness of New York, but simply on account of those conditions. I am very glad to have heard from Mr. Kennedy and Mr. Gill results that amply confirm the figures given in the paper. I think the discussion in general fulfills the object of the paper, which was to give an opportunity to telephone men for the discussion of this interesting subject. The paper is considerably compressed; in fact, I cut out of it altogether one subject to which Mr. Gill has made reference, because I did not think that one could cover the two subjects in an evening. My original idea was "Telephone Traffic and Telephone Tariffs," but I thought the title was too alliterative and the subject somewhat too long. But I thoroughly realize the very important relation between traffic and rates. I think most of the comments that have been made really result from the fact that the paper is very condensed, and that I have not elaborated many of the points that I do draw attention to. Mr. Cook chided me gently for not giving sufficient importance to the fact of the definite disconnection signal being obtained by the double supervision, but really unless I had used large capitals I do not think I could have said it more forcibly than I did when I stated that it constituted an immense advance in telephone operating.

(*Communicated.*) Referring again to Mr. Cook's remarks, I do not think is is misstating the case to say that automatic supervision has resulted from the use of lamp signals and central energy. It is possible to have automatic supervision without either lamp signals or central energy, but until lamp signals and central energy were in general use automatic supervision was not a part of telephone practice.

Both Mr. Kingsbury and Mr. Goddard say that the paper might have gone further in describing the lines on which traffic studies should be conducted. Undoubtedly it might; but if I had attempted to describe in detail what the paper refers to in essence there would have been no time for the interesting and valuable discussion which occurred. Mr. Kennedy's observations are of the greatest interest, and afford striking testimony of the truth of Mr. Gavey's remark, that modern telephone apparatus does more than make two blades grow where one grew before. With the telephone apparatus of the past era it would be impossible to achieve such results as those described by Mr. Kennedy; and it would be impossible, either with magneto apparatus or with the apparatus that is sometimes upheld in opposition to the common battery system, to work the system of 150,000 stations existing in New York to-day, and give even a reasonably efficient service to the public.

I entirely agree with Mr. Gill's remarks as to the close connection between traffic and rates, and as to the unsoundness of flat rates. In large cities there should be no flat rate,

but the charges should be based exclusively on traffic—on the volume and range of the traffic originated by the individual user. The adoption of this principle is dictated not only by the fact that the amount of service used regulates both the cost of supply and the value received by the consumer, but also by the very important fact that the general efficiency of the service is higher under message rates than under flat rates—due, as Mr. Gill has pointed out, to the decrease of ineffective calls. I also thoroughly concur in Mr. Gill's observations as to the importance of organization. Without the most thorough organization the best apparatus is largely robbed of its value, while with efficient organization surprisingly good results may be obtained from relatively inferior apparatus.

Not having all the data at hand, I cannot undertake to answer all Mr. Preston's questions. The service testing at New York is entirely secret to the operating staff. The service is almost exclusively message rate, and in any case, for statistical purposes, the meter keys are used on all connections. The meter key is pressed just before the operator takes the connection down. I regret that I have not complete information available on the other points raised; these deal with details in which it is important to be accurate, and are dependent on local conditions subject to more or less continuous variation. It would perhaps be safer for Mr. Preston to apply directly to the New York Telephone Company for the information he seeks.

As Mr. Cohen has pointed out, it is occasionally alleged by those who adopt an uncompromising attitude toward common battery working that the talking by common battery is inferior to local battery talking. Mr. Cohen is quite correct in saying that under the best conditions local battery talking is better than the average common battery talking; but it is unquestionable that the average common battery talking is superior to the average local battery talking.

Mr. Napier draws attention to a highly interesting point—the unwillingness of the British telephone subscriber to use his telephone service properly or to use and pay for sufficient telephone facilities to cope with his traffic. The education of the telephone subscriber has been greatly neglected in this country, and the education of the user is an important item in traffic study, and indeed in telephone management generally.

THE PRESIDENT: I now ask you to give a formal vote of thanks to the author for the very interesting paper he has brought before us.

The resolution was carried by acclamation.

Editor's Note.—The foregoing paper was read before the London Institute of Electrical Engineers.

TELEPHONES IN THE FORESTS OF MAINE.

A traveler treading the forests of northern Maine, particularly that heavily wooded section lying north and east of Moosehead Lake and extending to and along the west branch of the Penobscot river, will be struck with wonder when he sees the extent to which the march of progress has left its tracks in the shape of the telephone, says the Bangor Commercial. Passing through what is apparently virgin forest, the traveler will come upon the bright wires attached to the little porcelain insulators and running from tree to tree. In much of these woods through which these telephone lines run there is no trace of man. The trees are as thick and as strong in their primeval strength as though no man had ever invaded the depths of the vast wilderness, and yet many of these forest monarchs are living telephone poles and bear on their massive trunks and but little above the reach of a man's hands the wires over which hundreds of messages go singing every day.

Useful as the telephone is in the city, where the steps it saves would in any case be made easy by the use of the automobile, electric or fast express, it is far more useful in the forest, where there are none of these conveniences and where the canoe or bateau is the common vehicle of travel. The manner in which the telephone is used to help the men who drive the logs is perhaps the greatest feature of the whole system. The dams along the west branch have been built not only to hold water against a time of drought, but also to control the flood, so that it may let down the river at judicious times. To this end a considerable crew of men is kept at the dams all the time, so that the gates may be opened or closed on short notice.

As anyone who has read the many accounts of work on the drives which are published from time to time may gather, there are many places along the West Branch, particularly between Debsconeag and Ripogenus, where the water tumbles over ledges and between bowlders in a manner that is indescribably picturesque. The river driver, however, has little time to admire the beauties of these rough pitches. He has learned to look upon them as enemies and navigated with a sharp eye and a strong arm.

It is the work of the river driver to get the logs over these rough places without jamming or piling up on the rocks and running ashore. They are put on the logs with pick poles and cantdogs, prying the big sticks off the ledges and keeping them moving. The eye of every man in the crew is on a "glut" of logs coming down stream. They watch it as it nears a bowlder in midstream, and if the logs scatter and pass down river well and good. If they do not, but stop and pile up on the ledge, catching other logs coming down and piling up into a big jam, the river driver has his work cut out for him.

Then it is that the man at the telephone gets busy. Three long whirls of the crank of his little box calls the dam, and he tells the man who answers to close the gate and stop the logs from coming down until the jam is broken out. These orders given, he sets to work to break the jam. Usually a stick of dynamite placed with accuracy will start the logs and clear the channel, and if one stick is not enough there is always plenty more. The channel clear, the man goes to his instrument again and tells the crew at the dam to let 'em come. The man must use his judgment as to the importance of the obstruction and not order the gates closed unless necessity demands it.

Before dynamite came into common use on the drives there were some great times for the river drivers along Ripogenus Gorge. Then if a jam formed it was a case of getting down onto the logs and breaking it out. A man was lowered down from the ledge above, 100 feet or more, and went out on the jam. Fastening a long line to a log he made his way back to shore. Then the crew surged on the line and pulled the logs off the jam until the key log could be cut or broken. This was the "dog line," and many are the yarns old river-men tell of the days when it was used.

Before the telephone came into use these messages were conveyed up the river by relays of men. The men were stationed at frequent intervals along the bank, and the message was shouted from man to man. The telephone lines are being extended every year, and it will not be long before telephones are almost as common in the woods as they are in the city. Considering the country through which the men doing the work have to travel, the lines are put up in remarkably quick time, for a small crew of men will put up many miles of wire in a week. The lines spoken of in this article are not the only ones in the Moosehead and connect many of the sporting camps about the lake; they also run up the North Branch of the Penobscot.

Recently the telephone has been called into use to aid the fire wardens in discovering and extinguishing fires in the northern forests. A station has been established on the summit of Squaw mountain, about six miles west of Greenville. A man stationed at this point can see the country for miles around and with the aid of powerful field glasses and range finders can discover and locate a fire within range of sixty miles in any direction.

United States Independent Telephone Co.

EARL C. LONG

THERE has been a great deal written during the past month about the plans of the United States Independent Telephone Company, the new corporation that recently took out a charter in New Jersey and subsequently increased its capital stock from $100,000 to $50,000,000.

Announcement has been made that the permanent organization was completed at Rochester, New York, October 7, and the directors of the company elected at that meeting are given as follows:

Adolphus Busch, president of the Anheuser-Busch Brewing Company; Walter B. Duffy, president of the New York & Kentucky Company; George Eastman, president of the Eastman Kodak Company; August Gehner, president of the German-American Bank of St. Louis; Robert C. Hall of Pittsburg, head of the syndicate which owns the Independent Telephone Company of that city; Joseph J. Heim, president of the Kansas City Independent Telephone Company; Thomas W. Finucane, manager of the Stromberg-Carlson Telephone Manufacturing Company of Rochester; James B. Hoge, president of the National-Interstate Telephone Association; Hendrick S. Holden, of Syracuse, president of the Commercial National Bank of that city; Breckinridge Jones, vice-president of the Mississippi Valley Trust Company of St. Louis; William F. Nolker, president of the Kinloch Telephone Company; William H. Page, Jr., lawyer, of New York city; Eugene Satterlee, president of the German-American Bank of Rochester, and president of the Stromberg-Carlson company; Hiram W. Sibley, capitalist. Mr. Sibley is a son of the late Hiram Sibley, who was one of the founders of the Western Union Telegraph Company and its president during the first eighteen years of its existence; O. C. Snider, manager of the Kansas City Independent Telephone Company; Henry A. Strong, of Rochester, vice-president of the Eastman Kodak Company; James S. Watson, vice-president of the Security Trust Company of Rochester; John C. Woodbury, director of the Alliance Bank of Rochester; Edward Bausch, vice-president of Bausch & Lomb Optical Company, of Rochester; Benjamin B. Chace, of Ætna Indemnity Company, of Rochester; J. Wesley Kingston, of Moseley & Motley Milling Company, of Rochester; Morris D. Knapp, of Woodbury Whip Company, of Rochester; William J. Naylon, of Lake Ontario Improvement Company, of Rochester; John N. Rauber, vice-president of Whitmore, Rauber & Vicinus Company, of Rochester; Frederick W. Zoller, of Union Trust Company, of Rochester; H. A. Bingham, of Registrar & Transfer Company of New Jersey.

The formation of this gigantic organization followed closely the extensive tour of a notable group of business men, financiers, capitalists and Independent telephone promoters. Many of the principal cities of the middle west were visited, and at a banquet held at the Genesee Valley Club, Rochester, September 13, certain responses which here follow give expression to some of the plans contemplated.

At this banquet, which promises to be of historic interest to the Independent telephone industry, Eugene Satterlee, president of the German-American Bank, presided as toastmaster. In making his address of welcome, Mr. Satterlee said that he believed he was addressing the most prominent aggregation of telephone interests that had ever assembled in any city of the United States. He then went on to give a brief synopsis of the growth and development of the Independent telephone situation in that state and of the influential position held by Rochester.

Mr. Satterlee introduced, as the first speaker of the evening, James B. Hoge, of Cleveland, president of the National-Interstate Telephone Association of America, and secretary of the Cuyahoga Telephone Company of Cleveland. Mr. Hoge said in part:

"I believe that this will prove eventually to be a celebrated meeting. The Independent telephone movement was in its beginnings spasmodic, and the experience of the companies has been practically the same. They have all grown and prospered. In December, 1894, when some of the Bell patents began to expire, there were less than 300,000 telephones in use in the United States; to-dav there are more than 4,500,000, an increase of over 15,000 per cent. The Independent companies were fairly started by 1895, but each paid little attention to its neighbors until city and country boundaries were reached. Then they began to figure on and to put in connections, until now it is possible to talk between points from 500 to 800 miles apart, by Independent systems.

You people of Rochester have taken the pains to investigate the subject thoroughly and you should help to reap the benefit. When you come to look the country over, you will find the Independent telephone industry is well developed. The capitalists of the country have invested $225,000,000 in Independent telephone companies, and not two per cent of that has come out of Wall street. The great majority of the money has come from states where the lines have been constructed.

It may be asked where all this is to end. I think it is safe to say that not until there is a ratio of at least one telephone to every ten of population. I mean by this that when the population of the United States reaches 90,000,000 there should be at least 6,500,000 Independent telephones in use. The main trouble has been that the investing public has not appreciated the magnitude of the Independent telephone movement.

As to the situation from the manufacturer's viewpoint. The engineers that have engaged in the work have injected their ideas into the business with the result that taken as a whole the choice of instruments has been haphazard. The instruments, operation and accounts should be standardized. It will be found upon investigation that the manufacturers and operators are working hand-in-hand and are solving the various problems that has developed. The possibilities in the way of consolidation are very great. The possibilities of getting all the Independent companies into one system are also great. Independent lines now extend from 250 miles west of Kansas City to Philadelphia and Baltimore, but we have not yet sufficient wire. If we may use the language of the railroad to make the point clear, we've got the right of way, the roadbed and the power house, but we haven't got enough cars. When we get the cars it will not take us long to work up a business that will be astounding in its magnitude.

We should standardize our equipment and operate our various companies under the same rules and regulations. The national association of which I have the honor to be president has already undertaken the work of standardization, including accounts, so that capitalists may be able to take the report sheet of one company and compare it with another. We also have a plan to divide the states into districts and have a delegate elected from each district to the state body, and then delegates from the state body to a national organization, to facilitate the solution of whatever problems may arise."

At the conclusion of Mr. Hoge's remarks, Walter S. Hubbell, general counsel of the Eastman Kodak Company in the United States and Europe, was introduced. He told of the high value which bankers put on the stock of Independent telephone companies as collateral and said that he considered it highly probable that in the near future San Francisco and New York would be connected by a line operated by Independent telephone companies.

Robert C. Hall, a broker of Pittsburg, whose grandfather was one of the pioneer settlers in the Genesee valley, discussed the financial side of the question and said that, in his mind, the great key-note to the success of the Independent telephone movement was crystallization.

Thomas W. Finucane, speaking of the formation of the United States Independent Telephone Company, said that it was the first step in the movement to furnish telephone companies with standard apparatus and with a guarantee that

their supply would not be cut off through the absorption of manufacturing companies by the Bell interests. The chief object was to knit together in connecting systems the Independent telephone lines of the country and to aid Independent telephone companies in the installation of their plants and improvement of their service.

"There are to-day over 5,000 telephone companies in this country independent of the Bell systems," said Mr. Finucane. "In response to the demands of these companies for product and appliances and for a centralized unity of action the United States Independent Telephone Company has been incorporated.

The Independent telephone lines represented directly or indirectly by or through one or another of our directors, comprise systems which extend substantially from Kansas City, Missouri, to New York.

Our plans have been the subject of consideration for some months. In formulating them we have had conferences with leading lawyers in the cities of New York, St. Louis and Rochester; among them were: William H. Page, Jr., Samuel B. Clarke, William C. Trull and Frederick P. Delafield of New York City; Richard V. Lindabury of New Jersey; and Walter S. Hubbell of Rochester; and Judge Henry S. Priest of St. Louis, Mo.

In result we acquired and now own franchise rights in New York City which in the opinion of our attorneys, are similar in scope and character to those of the Bell Telephone Company.

These we propose to make the subject of the installation of a plant with a present capacity of 225,000 telephones and an ultimate capacity of 750,000 telephones for New York City and the tributary districts which environ it.

Our auditing advisers will be Haskins & Sells of New York, and our corps of consulting engineers on work under franchises will include J. H. Ehrehart, who recently resigned as expert to the State Board of Tax Commissioners of New York State.

Our company to-day authorized its collateral trust mortgage of $25,000,000 and the underlying securities will comprise a control of the Stromberg-Carlson Telephone Manufacturing Company, and the New York Independent Company, which latter owns the franchise rights previously referred to.

The bonds will be five per cent collateral thirty-year gold bonds. The trustee of the mortgage is Security Trust Company, of Rochester, N. Y. The coupons will be payable at its office and also at the Chemical National Bank of New York City."

At Pittsburg, during the itinerary of a tour of inspection of the Independent systems of the larger cities, Breckinridge Jones is quoted as having said:

"Our trip to Pittsburgh is to see for ourselves the Independent plant here, and we are greatly pleased with the results which the Pittsburgh & Allegheny company has achieved in the few years of its work. We do not plan at present a merger into one large company, but we do propose to bring the Independent companies throughout the country into closer touch with each other in every way and complete the work already begun of linking together the big cities and affording excellent long-distance service.

We have done much toward giving this united service.

For over a year a joint agent, Mr. Clapp, with authority to inspect all the plants in the six cities, Kansas City, St. Louis, Indianapolis, Cleveland, Louisville and Pittsburgh, has been at work. His task is to bring to uniformity the equipment where necessary and to see that the right connections are made between the cities. It is necessary in some cases to provide heavier copper wires for instance.

It is not desirable, at present at least, to amalgamate all the companies into one concern, for by so doing it would be inevitable that we should lose much of the support which has been the making of the Indepenedent telephone business. There are to-day 4,500,000 Independent telephones as against 2,000,000 Bell telephones. The growth of the Independent movement is more rapid, because there is behind it local capital in each city and the influence which the local interest can give. We can, however, strengthen each company by the standardization of equipment, by the construction of the right connections and by the education of the investing public in the value of telephone securities."

Mr. Jones is vice-president and counsel of the Mississippi Valley Trust Company, director of the Union Electric Light and Power and the Laclede Gas Companies, and treasurer of the Kinloch Telephone Company, all of St. Louis. As a banker with investments in the telephone field he is actively interested in Independent telephony.

Joseph J. Heine, the millionaire brewer of Kansas City, who is also prominently identified with the enterprise, is quoted as having said:

"The United States Independent Telephone Company is to be to the Independents what the American Telephone & Telegraph Company is to the Bell companies. We have bought the Stromberg-Carlson Telephone company, and it will be to the Independents what the Western Electric Company is to the Bell. We have bought the Independent companies at Utica, Rochester, Syracuse and other important up-state points in New York and have secured a charter to allow us to invade the city of New York with an Independent telephone system. There is but one company in that city and it has always been considered the Gibraltar of the Bell interests. We are going into the city to see what we can accomplish in the greatest field in the country for telephone competition."

Thus it will be observed that not least in the plans of the new company is its contemplated invasion of New York city. It is reported that four applications for privileges to operate telephones in New York city are already pending before the Board of Estimate and Apportionment, and it is probable that a decision upon their merits will be reached before the end of the year. Until the courts have finally decided as to the constitutionality of the act taking the franchise-giving power from the Board of Aldermen, no franchise will be granted by the Board of Estimate, but it is said that Mr. Grout is anxious that everything shall be in readiness and he has instructed Engineer Harry Nichols, the head of the Bureau of Franchises, in the Finance Department, to have his report completed as soon as possible.

The questions Mr. Nichols will have to decide are: What is the value to the applicant companies of the franchises asked; what is the value to the city of the price offered; and what will be a fair rental for the city to charge for the use of its subways, etc., and for the privilege to operate.

The Bell Telephone Company, which has had a clear field in New York, is said to have at last discovered that this latest attempt to form an opposition company is really serious, and that something must be done to avert the threatened invasion of the rich territory in the East by the Independents.

It is significant of the latest move against the Bell interests that the New York and the New York & New Jersey Telephone Companies (Bell licensees), following the familiar and time-honored practice when actual competition appeared, have, within a recent period, reduced rates in Greater New York and New Jersey. In New Jersey towns of 25,000 and upward, the rate for residence telephones, with the privilege of unlimited calls, has been reduced from $36 to $18 a year. Some small reductions have also been made in New York city.

The United States Independent Telephone Company proposes to operate under an old franchise, obtained some years ago. Application for rights to put wires underground have been sought from the city authorities. A promise that Independent telephones would be in use in Greater New York within eighteen months has been made and the company has offered to pay a liberal percentage of its gross receipts to the city.

So vast and so commendable are the promises of this latest acquisition to Independent telephony, it is needless to explain that it will require considerable space to keep pace with its efforts. It will be the mission of this publication to report progress from month to month, for TELEPHONY is nothing if it is not an authoritative record of Independent telephone activity and achievement.

DEATH OF W. D. BARNARD.

It is with regret that we announce the death of W. D. Barnard, which occurred in Philadelphia on October 16. Mr. Barnard was identified with the Independent telephone movement for many years, and was always an active figure in its development. At the time of his death he was president of the Eastern Telephone Manufacturing Company, vice-president of the United Telephone & Telegraph Company, Cumberland Valley Telephone Company and the Eastern Electrical Construction Company, besides being a director in many other telephone properties.

There are 53 telephone companies in Cass county, Illinois, with 578 miles of lines.

A Home-Made Cable Stringing Device

It sometimes happens that to do a certain piece of work it becomes necessary to divert from the usual channels and substitute something else to accomplish the same results. This was the state of affairs confronting W. I. Carpenter of Worthington, Minnesota, when it became necessary to place a new cable along one of his heaviest leads, one-half mile in length and turning a right angle corner. It was prohibitive to make a splice and erect in two pieces, on account of the uncertainty of a plumber making a good joint, nor could this length of cable be pulled in from one end without straining it and possibly pulling it in two, besides he was unable to get enough placing pulleys in the Northwest at the time. It, therefore, developed upon him to get busy within his own sphere and make a substitute that would accomplish this difficult work. The accompanying illustration will show how this was done with three men in two days. He mounted the reel at the front of a heavy wagon with a sort of derrick at the rear, with a hay fork pulley-wheel at the top over which the cable ran. He made what is called a trailer with two grooved wheels, which trailed along the messenger strand as the wagon moved forward, with another hay fork wheel mounted underneath, and over this latter wheel passed the cable which as the wagon moved forward would draw up the cable and lay it underneath the messenger strand, and this was followed up by a man on a trolley car, and tied in. The speed of placing this cable was limited only by the rapidity with which the man on the car could tie in. The wagon would move forward six to eight feet at a time and allow him time to catch up. As the cable was placed underneath the lead he encountered no obstructions except electric light crossing lamps, which he let down out of the way. The wagon was drawn forward with one horse and blocks in order to get a steady pull. The village of Worthington has a population of 2,700, and the exchange was started five years ago with forty-five telephones. It now has 450 subscribers and farmer lines extending into every part of the county. There are three Independent toll lines of one company and two of another. Mr. Carpenter has about 100 selective four-party-line telephones in service. The ingenuity displayed in construction might be emulated to advantage by other Independent exchange managers throughout the country.

UNIQUE METHOD OF STRINGING CABLE IN WORTHINGTON, MINNESOTA.

A PROPOSED KANSAS MERGER.

A charter has been granted the Citizens' Home Telephone Company, a corporation with a capitalization of $500,000, organized for the purpose of taking over and consolidating all the Independent telephone companies in southwestern Kansas. The incorporators are James Plottner and George Yeager, of Kansas City; Fred Perkins and D. J. Romino, of Oswego; George Spangle, of Chetopa, and C. H. Kimball and F. H. Brown, of Parsons. The general offices will be located in Parsons.

The companies to be consolidated are: Pittsburg Home Telephone Company, Galena Home Telephone Company, exchanges at Galena, Weir City and Scammon; Labette County Telephone Company, exchanges at Oswego, Chetopa, Altamont, Mound Valley, Edna and Bartlett, and the Parsons Home Telephone Company.

These companies have a total of 3,000 telephones and over 400 miles of toll lines. A copper circuit will be put in from Pittsburg, connecting with the St. Louis and Kinloch long-distance lines by way of Parsons to Cherryvale, where it will connect with the Kansas City Home Telephone Company's long-distance lines.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

United States Independent Telephone Company—Electrical World and Engineer, Oct. 14.

Announcement is made of the completion of the permanent organization, at Rochester, New York, of the United States Independent Telephone Company. The president states that the company possesses franchise rights in New York City similar to those owned by the Bell company. The plans of the new company are set forth in detail, in a statement quoted from the president of the company, and cover the furnishing of uniform equipment to Independents, and for a unity of action among Independent operating companies. It is expected to have 225,000 telephones in operation in New York City within two years.

FINANCE AND ECONOMICS

Telephone Publicity—SEARS.—*Sound Waves, October.*

It is desirable to present to the public in a striking way the great development of Independent telephony. Sufficient publicity has not been obtained in the past, and would greatly help the Independent telephone business.

Comparative Statement of Tax Returns of Independent Companies in Indiana—Sound Waves, October.

Interesting figures are given showing the gains made during the past year in the number of telephones, the capital stock, the gross earnings, the net earnings, bonds outstanding, and in other matters for 228 companies in Indiana.

Glasgow Corporation Telephone Accounts—Electrician (London) Sept. 15.

A somewhat lengthy analysis of the accounts of the Glasgow Corporation Telephone Department.

To Make Your Exchange Profitable—MOELLERING.—*Sound Waves, October.*

Telephony as a business is a mass of detail; and daily touch should exist with each detail. It is not always too low rates that make operating expenses equal to the income. It is stated that one busy operator gives better service than two who are not busy within reasonable limits. Attention is called to faults in management and operation in connection with the contract department, the collection department and the construction department. The disadvantages of free service with nearby towns is pointed out.

Telephone Investments—DICKSON.—*American Telephone Journal, October 14.*

Extracts from a book recently published by President Dickson.

Has the Telephone Value—Finance, October 7.

An article taken from President F. S. Dickson's book on Telephone Investments. Five points to be taken into consideration in making the investments are given. Inquiry into the junk value of a plant often proves most discouraging. It is pointed out that scrap rails used in railroads is less than 50 per cent of their cost to the railroads. Scrap copper wire is, however, worth over 80 per cent of its cost to the telephone company. The advantage is still more favorable to the telephone enterprise, when it is considered that it is worth about 36 per cent of the original cost to remove the steel rails and deliver them to the furnace whereas scrap copper can be sold on the ground as junk at 80 per cent of its cost. Again if a rail breaks it is ruined; if a wire breaks it is spliced. Comparison is made between the values of rights of way bought by railroad companies and by telephone companies, again to the decided advantage of the telephone enterprise. The entire article is full of interesting thoughts told in a delightful manner.

Probabilities of Telephone Development—Finance, October 14.

An article taken from President F. S. Dickson's book on Telephone Investments. All public service corporations are vitally interested in the growth of the region which they serve, and an increase or decrease in population will cause a corresponding variation in the amount of equipment that the corporation can afford to maintain in the corresponding location. This is pointed out as a manifest advantage which a telephone company has over other kinds of public serving companies. A large portion of its properties may be economically shifted to meet varying public needs.

A considerable amount of data is given as to the number of telephones the Bell people have had in operation at various times in the United States. To-day the number of Independent telephones in the United States slightly exceed the number operated by the Bell companies. In Ohio the Independents have 670 exchanges and the Bell 157. There are 1,452 Independent toll stations and 196,617 telephones in Ohio, against 753 Bell toll stations and 104,379 Bell telephones. The most striking comparison made is that Independent companies claim 17,029 stockholders as against about 400 for the Bell.

The cost of supplying telephone service increases as the use of the telephone increases, and it is pointed out that the telephone company does not charge for your telephone but for the telephones to which you have access. In Cleveland the Bell rates have been decreased and the Cuyahoga company rates increased; and it is argued that in view of the increase in subscribers in both companies the Cuyahoga's change was the logical and just one.

Los Angeles has 18,000 telephones, or one for every eight people. In Cleveland the present development, including telephones in both systems, is over 33,000 telephones, or one for every fourteen people. If Cleveland had a development equal to that of Los Angeles it would have nearly 57,000 telephones. It is pointed out that one reason for this discrepancy is that Los Angeles, with its large number of well-to-do people, will naturally use a larger percentage of telephones, while Cleveland, having a huge labor population, has many that cannot afford a telephone. It is predicted, however, that within a short time Cleveland will have 50,000 telephones, and that the company that can give the best returns for the money will get most of this new business.

Independent Telephone Securities as an Investment—POWERS.—*Finance, Sept. 23.*

The requisites of sound securities are clearly set forth. It is pointed out that different classes of securities at different times take different rank in popular favor. At one time that general security which is now most popular (railroads) ranked about as oil and mining schemes do at present. But now it is realized that dividend paying railroad stocks or interest paying railroad bonds will buy money cheaper than anything else except government bonds. The difference is not so much in the thing as in the management and control.

At first Independent telephone securities were not favorably considered for various reasons; but on account of the fierce war waged against them the Independents were forced in self-protection to inaugurate the best possible construction and maintain systems of the highest efficiency, thus almost unconsciously laying the foundation for enlargement and affording the basis for high-class securities, based not alone on earnings, but on equipment.

The Independent telephone is a fixture. It has come to stay and the conditions behind its securities are permanent. The questions of earning power and intrinsic value are dis-

cussed, and points of primary importance as affecting the soundness of an investment are dealt with in detail. The article closes with this statement: "With these facts staring him in the face, can any reasonable man, banker though he be, doubt that with reasonably proper construction, reasonable rates, good service and conservative management, Independent telephone securities as an investment are not only safe, but desirable?"

United States Independent Telephone Company—Finance, Oct. 14.

A brief outline of the organization and aims of the new company bearing the name given above. Mr. Thomas W. Finucane has been elected president. This company owns the majority of the stock of the New York Independent Telephone Company, which has secured a franchise for the building of an Independent plant for New York City. Mr. Hoge, a director in the new company, states that the franchise is more liberal than the franchise of the New York Bell Company now operating.

The United States company is designed to be the holding company for a large number of Independent telephone companies, and has already taken over the Stromberg-Carlson plant at Rochester, and will shortly secure control of other companies operating in New York state.

It is not the intention of this company to take over all of the big Independent plants in the United States.

Bell Development in Ohio—Finance, October 14.

It is said that there is now one Bell telephone for every thirty inhabitants in Ohio, and in Cleveland one for every seventeen. A net gain in the total number of subscribers of 19,068 is claimed to have been made during the seven months ending July 31, 1905.

Value of Independent Telephone Securities—BERRY.—*Telephony, October.*

A paper read before the convention of the Central Illinois Telephone Association at Peoria.

Tour of Independent Telephone Leaders—Electrical World and Engineer, Sept. 23.

A large party of Independent telephone leaders have been making a tour of the country, preliminary, it is said to the consolidation of long-distance lines in a company with a capital of $12,500,000.

Pittsburg, Rochester, Cleveland, Indianapolis and Kansas City have been visited.

Tour of Independent Telephone Leaders—Electrical World and Engineer, Sept. 30.

Containing further information and some details regarding the proposed consolidations.

Is There a Place for the Independent Telephone System—Finance, Sept. 30.

It is stated that there are but few left who will dispute the fact. The article discusses the question set forth in the title at some length, the conclusion being in the affirmative.

The Development of the Telephone—Finance, Sept. 23

A short article giving considerable data as to the development ratio in different cities in the United States, and also of the various countries in Europe.

Telephone Question in France—Electrical Review, Sept. 23.

The telephone situation in France has reached a serious stage. The telephone department has been unable to keep up with the demands for service, and its present equipment is old. Telephone service is bad and telephone users in Paris have formed an association with a view to obtaining better service. The situation is cited editorially as being typical of what must be expected when a public service of this kind is being operated by the government.

Independent vs. Bell control in Ohio—American Telephone Journal, Oct. 7.

Independent telephone managers in Ohio are making an earnest effort to prevent the small exchanges from falling into Bell management. The state association is active in the work, and when it is learned that a local plant is in danger of going over to the Bell control arrangements are made to take over the plant for strong Independent interests. Instances in which this action has been taken are cited.

City-Owned Telephones—Telephony, October.

An editorial, in which Wm. Jennings Bryan and James Dalrymple are quoted.

Keystone Telephone Merger Movements—Finance, October 7.

The Keystone telephone people say respecting the $50,000,000 New York Independent Telephone Company, that at present there is no definite arrangement for the Keystone Company to enter into any consolidation of companies, nor is any option given on the stock. The claim is made that the Keystone is the largest individual Independent company in the country. The number of telephones in use in principal Independent plants in this country is given, Philadelphia being first with 17,000, Los Angeles second with 16,000, and Pittsburg and Cleveland third and fourth respectively with 15,000 each.

Competing Company for New York—Finance, October 7.

The announcement of an Independent company for New York has created much comment, and quotations under this heading from several eastern papers are given concerning the proposed enterprise.

Wall Street Journal on Telephone Competition—Finance, Sept. 23.

A short article dealing with the time-worn question as to whether telephone competition is desirable.

Indiana Organization Plan—Electrical World and Engineer, Oct. 7.

It is stated that the Indiana Independent Telephone Association has issued a pamphlet describing the plan of organization, and giving also operating rules and some facts and figures. A detailed review of the pamphlet is not given in the article.

Telephone Capitalization—Electrical World and Engineer, Sept. 23.

Telephone companies to the number of 247 have made returns to the Indiana tax board. The reports are interesting, and are set forth comparatively in the article.

New York Rate Reduction—Electrical World and Engineer, Sept. 23.

Following telephone rate reductions in the Borough of Manhattan, it is announced that rates will be reduced in the Borough of Bronx, effective October 1.

Auxiliary Battery Sets—BUNDESMAN.—*American Telephone Journal, Oct. 7.*

EQUIPMENT.

Battery cells in use on pole changers and similar ringing devices require daily attention; the requirements are severe, and the importance of the service rendered is great. Duplicate sets of batteries with a knife switch arranged to place either set in service will enable the set having a defective cell to be isolated until the cell is repaired. For testing, a lamp is of service where a voltmeter is not available, the lamp being shunted around as many cells as should give brilliancy; if the lamp does not respond, then the cells need attention. In any test of a battery, the true service conditions of the battery should be simulated, and not merely its open-circuit voltage taken; this the lamp device does. The lamp test may be made rapidly by attaching the lamp to a plug and providing proper jack connections with the batteries.

Night Dial for Automatics—Telephony, October.

Means are described for illuminating the dial of the Strowger set, to facilitate the making of calls at night.

High Wound and Bridging Toll Service Traffic—CLAUSEN.—*Sound Waves, October.*

A continuation of this serial begun in the August issue. Various types of cord circuits for connection toll lines are discussed and illustrated with diagrams. The article contains good matter and is to be continued.

A Cordless Switchboard—VON NAGEL.—*American Telephone Journal, Sept. 30.*

An illustration in diagram is given depicting a novel type of cordless switchboard designed by the writer. A board of twelve lines and the equivalent of eight cord-pairs is shown, although it is not shown why eight cord-pairs would be needed for twelve lines. The plan is simple and its construction and maintenance would be easy; the diagram seems complex at first glance, but becomes simple when

studied and the proper balance between cord-pair equivalents and lines is considered.

London to Rome by Telephone—Finance, October 14.

Telephone communication is said to have been established between these two points, a distance of 1,100 miles. This has been done by the aid of a microphone invented by Prof. Majorama. Conversation over this line is not yet easy, and in the test disjointed words have been heard. The professor hopes to do better. The longest distance for effective work from London is at present to Marseilles, a distance of 800 miles.

Telephone Party-Line—Finance, Sept. 30.

The startling piece of news is conveyed that one of the large telephone supply houses is bringing out what is known as the selective party-line signal, by which any bell on the four-party line may be rung without ringing any of the others. The article states that the ringer works on the harmonic principle.

Telephone Possibilities—Finance, Sept. 30.

A short article describing a number of adaptations of the telephone to domestic uses. As an example there are telephones that may be taken down at night and carried to bed with one, so that it may be used in case of need for the police or the fire department. A case is cited where a telephon was mounted in an old Sedan chair.

Accousticon—Western Electrician, Sept. 23.

A descriptive and illustrated article concerning this feature of telephone development.

The Telephone at the Fair—Finance, October 14.

A brief statement as to the telephone installation recently made by the Michigan State Telephone Company on the grounds of the Michigan State Fair at Detroit. Next to good transportation perhaps the most important facility for an exhibition of this kind is rapid communication between all parts of the ground and all of the subscribers in the various cities and towns surrounding. Seventeen pay station instruments were placed in the various tents and buildings connected to a switchboard in one of the buildings, the whole forming a permanent private branch exchange, connected by ten trunk lines with the main Detroit exchange.

Private Exchange Installations—COAR.—*American Telephone Journal, Oct. 7.*

Second article of the series. In selecting a switchboard the conditions to be met should be considered. If the system is to be installed close to a telephone exchange, it is possible that current supply may be secured from the main exchange battery. If this is not possible, local battery must be installed. Regardless of these points, the system should be designed to operate simply, with a minimum of apparatus and of current consumption. Figures 7 to 12, inclusive, are shown in connection with this installment, and illustrate both magneto and common battery switchboards for the purpose.

Modern Telephony—RADCLIFFE.—*Telephony, October.*

A continuance of the series. The present installment is devoted to the transfer switchboard, of the magneto type.

A Communicating Block Signal System—TYLER.—*American Telephone Journal, Oct. 7.*

Development of interurban electric railways has necessitated the use of apparatus for the protection of moving trains, which will assure safety in as high a degree as that required for the protection of steam roads. For steam railways, the block system is considered the most practical; it consists of the division of the line into blocks; at the end of each block are signals indicating whether the two blocks ahead are clear; if there is a train in the block immediately ahead that fact is indicated; if there is a train in the second block ahead and the first block is clear, that is signaled definitely. Numerous schemes have been originated having for their object a means of communication between the train and the signal towers or stations. The McClintock system, being a solution of this problem for interurban railways, is given in considerable detail; auxiliary rails in the track for signaling are used, and telephonic communication is provided for.

Best Conditions for Long Distance Service—HIGGINS.—*Sound Waves, October.*

Evidently a reprint of a lecture or talk made by this author on the subject above stated. Good long-distance service must rest on first-class material and construction. Toll lines may naturally be divided into two classes; main lines and feeders. The constructive details of both of these classes of lines are described, and there is also a discussion of central office equipment, the method of handling toll service and rates.

OPERATING.

General Traffic Work—JACQUETTE.—*American Telephone Journal, Sept. 30.*

The conditions requiring intermediate-distributing-frame work are discussed, and the remedies shown; the requirements of an operator, both in selection and training, are considered, and the proper assignment of substations to party-line service.

Telephone Traffic—WEBB.—*American Telephone Journal, Sept. 30.*

Third series of extracts from a paper read before the British Institution of Electrical Engineers with diagrams.

Promoting Operating Speed—MOORER.—*American Telephone Journal, Oct. 14.*

A bulletin is kept, on which the standing of each operator is posted, and is open to the inspection of all operators, to promote a rivalry among them; in addition, the operator standing highest each month has a bonus of twenty per cent added to her wages for that month. The status rating for the bulletin is obtained from observations made for the purpose.

A Proposed New Method of Handling Toll Checks—CROSS.—*American Telephone Journal, Sept. 30.*

This follows an article by the same writer in a preceding issue wherein was discussed the development of the transmission of toll checks since the advent of the recording system of handling toll business. The method proposed is to use a telautograph, by which the recording operator writes the check telautographically in front of the required switching operator. The circuits and board equipment is discussed, and illustrations of the apparatus are given.

Methods of Connecting Exchange Lines to Interior Systems—PARKER.—*American Telephone Journal, Sept. 23.*

Seven circuit diagrams are given, showing methods of accomplishing this result under various conditions.

Telephone Traffic—WEBB.—*American Telephone Journal, Sept. 23.*

Second series of extracts from a paper read before the British Institution of Electrical Engineers. Diagrams are given in illustration of some of the extracts.

Telephones to Check Forest Fires—Electricity, Sept. 30.

For the better protection of the forest reserves against fire, the forest service, in co-operation with the weather bureau will install a system of telephone lines and stations, the first to be on Big Horn forest reserve in Wyoming.

Toll Line Methods in Nebraska—STADELMAN.—*Sound Waves, October.*

Very gratifying success has attended the central Nebraska toll association, and the advantages of such associations are set forth. The association comprises fourteen companies in central Nebraska, operating over 5,000 telephones. The toll rate charge is based on one cent per mile for 25 miles and one-half cent for each additional mile. The minimum charge is 10c, unless between stations belonging to more than one company where the minimum is 15.

Code for Telephone—Telephony, October.

In transmitting single letters by telephonic speech, as for instance in speaking the initials of a name, very many of the letters of the alphabet sound very much alike, so much so that mistakes occur constantly from this cause. It is proposed to use the letter as an initial of a well-known proper name, the name being easily understood by telephone and thus determining by its initial letter the letter desired to be

transmitted. This system has been in use long in other arts, and no doubt would fill its niche in telephony.

Telephone Density—Electrical World and Engineer, Sept. 23.

By telephone density is meant the number of telephones to the 100 people, viz., the ratio of telephones to population, usually expressed as a percentage. The question of telephone density as an indication of the limits of the future growth of the telephone business in this country is one which has received considerable attention of late. Random statistics are given in this article, pertaining mostly to New England and some foreign countries.

Department Store Telephony—Electrical World and Engineer, Sept. 30.

Department store telephones are being developed rapidly in New York and Philadelphia, it being the aim in some of the big stores to place a telephone on nearly every counter, giving free service into the store and making every counter a pay-station for outgoing calls. Siegel, Cooper & Co., New York, have taken 1,000 telephones and Gimble Bros., Philadelphia, have taken the same number. This is compared with the exchange of Marshall Field & Co., Chicago, with 300 telephones, which was the largest previously existing department store private branch exchange.

Extent and Limitations of Independent Toll Line Service—NORTON.—*Sound Waves, Oct.*

It is stated that the fundamental difference between Bell and Independent companies is that the former originated with the speculator and among other things were generously watered by him, while the Independent systems were organized for the purpose of procuring the benefits and blessings of telephone service for the people where the system operated. The companies controlled by the monopoly were never called upon to solve the problem as to where exchange service ends and toll service begins, being able to force upon the public whatever it chose in this regard. On the other hand, the first problem of the Independents was how far and to what extent can service be given for a flat rate, and where shall the toll charges begin. It is stated that the community served by any telephone system must of itself determine the extent of its exchange service, as it is impossible to define the limits either by the length of the line or by the number of subscribers it must serve. After the exchange limits have been defined, the service beyond it must be on a toll line basis.

Booths and Pay Stations as Money makers—FRENCH.—*American Telephone Journal, Oct. 14.*

It is estimated that fully seventy-five per cent of telephone messages are in some degree of a private nature. The natural result of a demand for quiet and privacy in telephoning is a telephone booth, insuring privacy by keeping the user's voice in and quiet by shutting the other noises out. Booths are used both in private offices and in public places. Long distance talking requires a greater degree of quiet than does local traffic. Place two telephones side by side, one in a booth and the other outside, and the one in the booth will be patronized three times as much as the one outside; this is demonstrated by a table of statistics. In the case of adjacent drug stores, the one with an enclosed telephone will draw three times as much telephone business as the one without the enclosing booth. In the table of statistics given, the amount of collections for a given period before the introduction of the booth, and also the amount of collections for a similar period after the installation of a booth, also the amount of difference and the percentage which the difference bears to the original revenue from that pay station. In the fourteen instances given, thirteen of them show more than fifty per cent increase, and three of them run above one hundred per cent, that is, the business of the pay station was more than doubled by the introduction of the booth. Where the volume of business warrants, the services of an attendant will be found desirable, particularly where the station originates a large amount of long-distance business. Details of choosing and caring for booths are discussed.

Handling Toll Checks—CROSS.—*American Telephone Journal, Sept. 23.*

The problem of handling toll checks is one still occupying the attention of engineers. By toll checks this writer wishes to designate those tickets written by an operator who receives a call from a patron and intended to be passed from her to another operator whose duty it will be to place the calling and called parties in communication. Since the introduction of the system whereby some operators are specialized to write the tickets and others to make the connections required by the tickets, a necessity has existed for a means of transferring the toll check from the recording to the switching operator. With small boards this problem does not present a formidable face, but with large boards the distance between the group of recording operators and the most distant switching operator becomes considerable, and the number of toll checks required to be passed also increases largely. Belts with clips were used; then pneumatic tubes were used, blowing the tickets through from a central distributing station to the proper switching operator. The pneumatic system is discussed at length. The assignment of toll checks to toll operators may be made on any of three bases—according to the point of destination, according to the nature of the trunks, or according to the distribution of business among the operators.

Concerning Telephone Traffic—MCMEEN.—*Telephony, October.*

Early multiple switchboards were arranged for single-wire or grounded lines, and were constructed with a simplicity of mechanism which has been sacrificed in the introduction of the two-wire line, for metallic-circuit service. The first of those early boards had pairs of plugs and busy test conditions very similar to the modern metallic-circuit board. In the hope of more efficient operation, boards were designed having a single plug per line, which line plug being inserted in a jack or some other line would connect the two lines together for conversation. Each type of board had its advocates, and it is probable that no exact comparison of the two types of board ever was made. Later, a system of switching involving the handling of each call by two or three operators, all switches being guarded and promoted by automatic signals, was devised, and at that time was called the "express" system, and good results were obtained with it. The conclusion, however, seemed that the excellence displayed by the divided automatic type of switchboard lay not so largely in the fact of dividing the work of a connection between two sets of operators, as in the advantages of automatic signals. This resulted in the installation of a switchboard embodying the best type of multiple practice with the best type of automatic signals at that time developed, since which time there has been no notable improvement in the art of switching telephone calls by hand.

Ring Wiring—HAMMERSLEY.—*American Telephone Journal, Sept. 30.*

LINES AND LINE CONSTRUCTION.

Circuit distribution in closely built districts is a problem which differs largely from that encountered in suburban or rural localities. The most improved method utilizes a scheme called the "block." In the center of blocks consisting of the area inclosed within four streets, terminal boxes are installed. From there the twisted pairs are run through rings fastened to fences or walls, and in this manner distributed to the subscribers' stations. The cable leading to the terminal box is brought in underground and the box placed in a dry cellar to which access can be readily secured at all times.

Notes on the Localization of Cable Faults—JOSEPH.—*London Electrical Review, Sept. 15*

The object of the article is stated to be not to suggest new methods but to investigate the conditions under which tests already published are likely to be useful and to ascertain what steps should be taken to find the position of a fault, the nature of which is such that no test known to the writer can be applied with certainty.

Lake Como Cable—Telephony, October.

Rather than build around the end of Lake Como, Italy, the telephone company decided to install a deep-water cable of a mile and a quarter in length across the lake. The cable has been installed and in operation has been found entirely satisfactory. The cable contains but a single pair of conductors; cross sections of the cable are given in the illustrations.

Telephone Wires on Power Transmission Lines—Electrical World and Engineer, Oct. 7

A diagram is given of a method of transposition which has proven successful on a twenty-mile line.

Toll Line Testing—BISHTON.—*American Telephone Journal, Sept. 23.*

A method is described, and is illustrated by circuit diagram. The diagram shows a circuit for a toll station through which the toll line passes, provision being made for opening the toll line at that station by the operator at the switchboard, while tests are being made upon the line from the exchange at the end of the circuit.

Rural Exchange and Line Construction—STERRETT.—*Western Electrician, Sept. 30.*

Extracts from a paper read before the convention of the Central Illinois Telephone Association, at Peoria.

Exchange and Underground Construction—CRAIG.—*Telephony, October.*

Paper read before the convention of the Central Illinois Telephone Association, at Peoria.

Bell Long Eistance Telephony—Elettrical World and Engineer, Oct. 7.

The American Telephone and Telegraph Company is laying an underground cable between New York and Philadelphia. In the near future underground cables will be in use between New York and New Haven and between Boston and Providence. Ultimately, it is expected to operate underground circuits between New York and Boston. It is stated that a telephone repeater is being used by the Bell company which, it is inferred, makes practicable these underground cables of such length.

Telephone Towers for River Crossing—Telephony, October.

The Independent Telephone company of Council Bluffs, Iowa, will cross the Missouri river by means of two steel towers, 125 feet high, erected two miles south of that city.

Transposition of Telephone Lines—BOYRER.—*Technical World, October.*

From Instruction Paper on Telephony, Part III, written for the American School of Correspondence. It follows from the laws of self-induction that if two wires be placed parallel to each other a change of current in one wire will produce currents in the other. These induced currents may be caused by the magnetic field or by the electric stress between the two wires. Illustrations are given showing these two principles. This effect will be produced between two telephone wires running parallel or between a telephone wire and a light or power circuit. Experiments have tended to prove that electromagnetic induction on telephone lines is negligible. If the telephone circuit is metallic and the disturbing wire is placed so as to be equidistant from the two limbs of the metallic circuit, no induced current will be produced in the latter; when the two limbs of the metallic circuit are at unequal distances from the disturbing wire a different condition prevails and crosstalk or noise occurs. It now will be apparent that if two metallic circuits are placed side by side, a crosstalk or noise effect will be produced. This condition is overcome by transposing the conductors of one of the circuits at definite intervals so that, as a result, each of the conductors or limbs of the transposed line is equal to its mate in its average distance from either of the wires of the untransposed circuit. When more than two circuits are involved, all the circuits must be considered in the transposition of each of them. The standard scheme worked out for transposing conductors on lines carrying several crossarms is shown diagrammatically in one of the figures accompanying the article.

GENERAL.

Principles of Central Energy Systems—TAYLOR.—*Sound Waves, October.*

Another of a series of articles on this subject by the same author. In this installment the action of the apparatus at the subscriber's station in common battery systems is dealt with. The disadvantage of placing the receiver directly in the battery supply current is pointed out and the various methods of associating the receiver with the line in order to prevent this, and at the same time to secure other advantages, are dealt with. The article is illustrated by seven diagrams.

Telephone Notes—Electrical Times, (London) Sept. 21.

Correspondence is quoted in reference to the situation at Brighton, which, it is stated, makes it evident that the government would prefer to make some purchase arrangement with the municipalities for acquiring their telephone services.

Trees in Wireless Telegraphy—Sound Waves, October.

United States government experts are said to have discovered that trees may be utilized as the antennae of wireless telegraph station. It is not stated how the apparatus should be connected with the ground, nor, in fact, are any details given. It is also stated, and it is a point of interest that in laying telephone lines in wooded country for military service, a much better ground could be obtained by driving an iron nail in the trunk of a tree or shrub than by the more usual and laborious means of burying a plate or driving a rod in the ground.

Development and Future Tendencies of the Telephone Art—CLEMENT.—*Sound Waves October.*

Most telephone engineers have grown up with the art, and almost every one of them has made some contribution to the knowledge and expedience upon which the present art rests. The fact that improvements made to-day are rendered obsolete by those of to-morrow is made apparent, and the effect of this rapid improvement on the commercial situation is discussed. The thought is also expressed that the granting of monopolies as a reward to inventors sometimes actually tends to retard progress; but any corrective measures which would destroy the possibility of superlative individual rewards would inevitably remove the incentive to superlative effort.

Telephony in Manilla—Electrical World and Engineer, Oct. 14.

The Philippine Islands Telephone company is preparing to begin business in the city of Manila; underground conduits are now being installed.

Bell Telephone in Washington—Finance, Oct. 7.

It is pointed out that the great political leaders in Washington are tremendous users of the long-distance service, and that the use of the telephone in various governmental departments at Washington is great and increasing.

Practical Wireless Telephony—Telephony, October.

A further recital of operations by a pair of Pittsburg, Pa., experimenters, who have been noticed previously in these columns. Results are still promised.

Albany, New York, Independent Telephony—Telephony, October.

A recital of the history of the Albany Independent telephone plant, and the personnel of the company.

Independent Telephony in Wisconsin—LONG—*Telephony, October.*

History and data concerning Independent plants at Green Bay, Wis., and DePere, Wis., are given. The article is illustrated.

Large Independent Plants—Electrical World and Engineer, Oct. 7.

A list is given of the approximate number of Independent telephones in use in some of the larger cities of the country.

Independent Telephone Maps—Electrical World and Engineer, Sept. 30.

The National Interstate Telephone association has begun the preparation of maps showing the Independent telephone development throughout the country. These maps

are being made by states, and when completed will be kept up to date by adding new information as rapidly as reported.

New York Independent Telephony—Electrical World and Engineer, Oct. 7

A large number of applications are on file in New York city for Independent telephone franchises. Details are given in the case of three of the applications, giving the terms proposed by the application and the scope of the franchise asked.

The Capacity of a Condenser—WILDER.—*Telephony October.*

The condenser plays an important part in nearly all modern telephone installations, and any discussion relative to it will be of interest to telephone engineers. With condensers in such general use in telephone work, a method of measuring their capacity simply is desirable; such a method should not require the use of apparatus other than that usually found in an ordinary exchange. Methods are given, with diagrams.

Tragedies and Romances of the Telephone—BARRY.—*Telephony, October.*

A collection of incidents connected with the use of the telephone, ranging from murders and marriages to physicians' prescriptions and the foiling of the hookey habit of the schoolboy.

Death of John I. Sabin—Finance, Oct. 14.

Gen. Sabin made many contributions to the telephone industry, both in schemes of operation and mechanism, and in careful investigation as to the best method of conducting the telephone business. His enterprise and ability have brought about a telephone development in the Pacific states unsurpassed anywhere else in the United States.

Home for Female Telephone Employes—American Telephone Journal, Sept. 23.

A stock company has been organized in Paris, France; the co-operative plan has been adopted, and a plot of ground obtained near the main office of the telephone department. The cost of the building is estimated at $100,000.

Cable Testing Arrangement—BRINSER.—*American Telephone Journal, Sept. 23.*

A method is described and illustrated by circuit diagram.

The Correspondence School—Sound Waves, October.

An editorial advising ambitious workingmen to take up work in some good correspondence school, if he has within himself the determination of stick to it in spite of hard work. No man need be afraid of the school.

Ericson Company Will Build Factories—Electricity, October 18.

A short item saying that the Ericson Telephone Company, the largest manufacturers of telephones in Europe, will erect a large factory in Buffalo, New York, the power for which will be obtained from Niagara Falls. This company is preparing to establish a telephone system in Mexico.

Joint Telephone and Time Ball Circuit—Western Electrician, Sept. 23.

The time and time ball methods of the government service are described, and in connection with the description of the Chicago details there is shown a circuit by which the time ball circuit to the Masonic Temple from the federal building is used for telephonic purposes as well as for the time ball service.

Telephones and Postal Cards—Electrical Review, Sept. 30.

An editorial in which the decrease in the use of postal cards proportionately in the mail service is discussed together with the rise of the telephone. It is assumed that many messages formerly transacted by postal cards now are transacted by telephone.

Tape Line Kills—Western Electrician, Oct. 7.

Two telephone linemen used a tapeline in which were small steel wires to keep the line from stretching; the tapeline was thrown over a high-tension transmission wire and both men were killed almost instantly.

Machine Noises and Cross Talk—LORING.—*American Telephone Journal, Oct. 7.*

This is a subject of much importance to those exchanges where such noises manifest themselves, and causes and remedies are given in this article.

Competition and Chicago Bell—Telephony, October.

Competition for the telephone service required by the city of Chicago has offered opportunity to compare prices and practices of the Chicago Bell company with those of some Independent companies.

Independent vs. Bell Connections—Telephony, October.

An Ohio exchange connected with Bell toll lines in lieu of Independent on May 9, and returned to the old practice on July 18, finding from the experience that they had very few calls for points reached exclusively by the Bell, and had many calls which could not be reached by the Bell. The two Independent companies in Indiana which have connected with the Bell are maintaining their connections with Independents also.

ALFRED STROMBERG.

We reproduce below a cartoon of Mr. Alfred Stromberg, which appeared in the Chicago Post of October 6, under the caption of "men of affairs." The Post's series of cartoons include only the prominent men of Chicago, who

ALFRED STROMBERG.

have been a part in the development and building of the city, and who are its representative citizens.

To telephone men Mr. Stromberg needs no introduction. For twenty-eight years he has been a factor in the telephone business of this country and continental Europe. In this country he has been so closely identified with the Independent telephone business that when its history is written his name will appear as one of the pioneers who has worked hard and conscientiously for the upbuilding of a great movement. His inventive genius and business sagacity has made him a power in the industry. At the age of 44 Mr. Stromberg is a wealthy man, and has a host of friends among the telephone and electrical fraternity.

Modern Telephony: Theory and Practice

W. H. RADCLIFFE

CHAPTER X.

MULTIPLE SWITCHBOARDS.

IN LARGE exchanges the multiple type of switchboard has many advantages, for in each section may be found the terminals of all the subscribers' lines. These terminals end in spring jacks mounted on the face of the board, and in order that all of them be within easy reach of the operator the jacks must be made as small as possible and placed closely together. The manner in which these jacks are connected with the subscribers' circuits gives rise to two classes of multiple switchboards, known respectively as the multiple-series board and the multiple-bridging board.

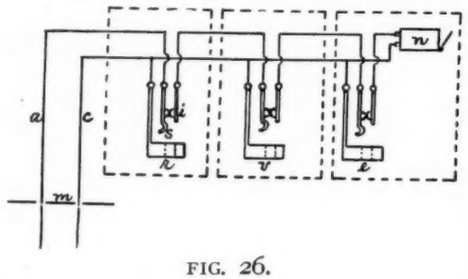


FIG. 26.

In the multiple-series board the jacks are joined in circuit as shown in Fig. 26, *a* and *c* representing the wires of a subscriber's circuit leaving the main distributing board *m* and connecting with the jacks *r, v, e,* etc., and the line drop *n*. Three sections of switchboards are here represented by the dotted lines, and it is seen that the side *a* of the circuit passes through each of the jacks in series while the side *c* connects, in turn, with each of the rings of the jacks, both *a* and *c* terminating at the drop *n*. The last jack, *e*, connected to a subscriber's circuit is called the answering jack, and together with the drop *n* is placed in that section of switchboard before which is the operator who attends to this subscriber's calls. The other jacks, *r, v,* etc., connected to the circuit are called the multiple jacks, one of which is mounted in each remaining section of the switchboard. The subscriber's telephone number is placed on the drop *n*, on the answering jack *e*, and on each of the multiple jacks connected to his circuit. The operator's circuit used in connection with this type of board is the same as that employed on the transfer switchboard, save in a few details to be discussed later. The introduction of a plug on the operator's circuit into one of the jacks, *r*, for example, forces the brass springs *s* and *i* apart; this cuts out the remaining jacks *v, e,* etc., behind it, and also the line drop *n*. The line drop *n* being cut out whenever its circuit is in use, is constructed in precisely the same manner as the line drop of the transfer switchboard.

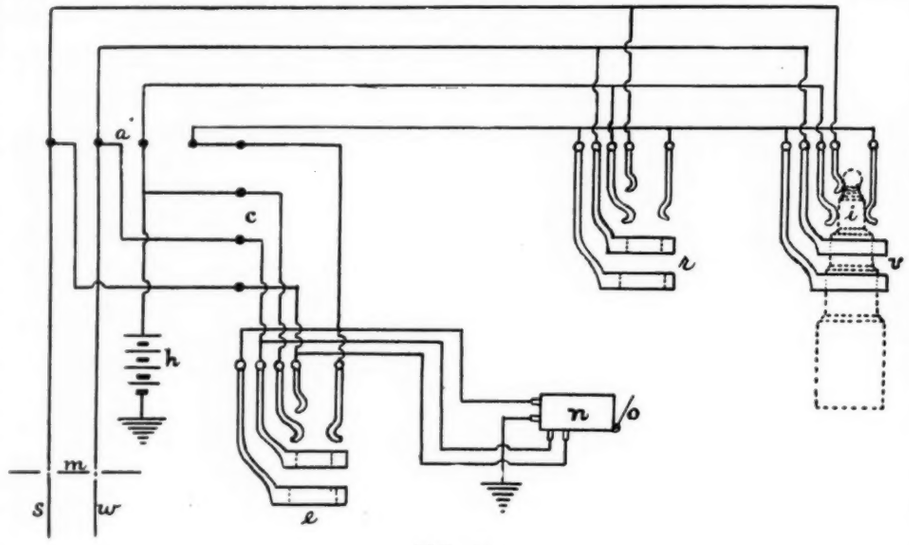


FIG. 27.

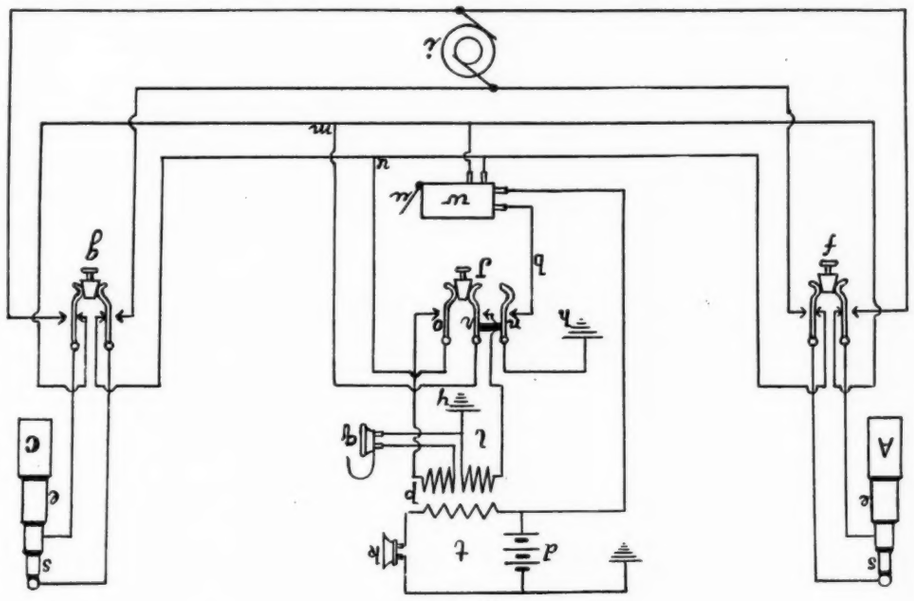
A subscriber signaling with his magneto-generator in this system would cause the shutter of his line drop *n* to fall, and the operator in whose section this drop is located would insert her answering plug in the answering jack *e*, and upon learning through her listening key the number desired would introduce the calling plug of her circuit into the multiple jack on her section bearing the required number. If the subscriber's circuit to which this multiple jack belonged was not being used on some other section of the switchboard, communication between the parties could at once be established. It is necessary, however, that the operator before making this connection determine that the line called for is not in use or busy, for if the called subscriber was already engaged in conversation he would be greatly disturbed by the operator introducing another subscriber's line in circuit. The method used by the operator to determine the condition of a line before connecting to it is known as the busy test, and is applied when the calling plug is being introduced into the multiple jack.

The arrangement of the operator's circuit to provide means for making the busy test is the distinguishing feature of the wiring in the connecting cord circuit on the multiple-series switchboard. It consists of a battery having one of its terminals grounded, and the remaining terminal connected to the shanks of the plugs. A grounded connection is also made with the circuit passing through each operator's head receiver. Whenever a plug is inserted in a jack the battery is thereby electrically connected with the rings of all the jacks on that line, as is evident from Fig. 26, since the rings are all connected by the wire *c*. In case any other operator desires to connect with that line she first performs the busy test by touching the tip of her plug to the ring of that line in her section, and if the line is already in use current from the battery previously mentioned will pass through her plug and head receiver to ground, causing a sharp click in the receiver, which therefore warns her that the line is being used.

In the multiple-bridging board the jacks are joined in circuit, as shown in Fig. 27, *s* and *w* representing the wires of a subscriber's circuit passing first through the main distributing board *m*, and then through the intermediate distributing board *a c*. The four terminals at *a* represent those on the horizontal side of the intermediate dis-

tributing board, and the four at *c* denote those on the vertical side. Connecting with the former set are the multiple jacks, *r, v,* etc., and with the latter set the answering jack *e* and the line drop *n*. It is thus seen that any answering jack and drop on the switchboard may easily be connected to any desired set of multiple jacks at the intermediate distributing board. By this means busy subscribers may be distributed among the operators, without changing their telephone numbers or disturbing the switchboard cables. In the multiple-series board, however, the line drop would be cut out if wired on a branched circuit, as in Fig. 27, unless the answering jack was used, so that the intermediate distributing board can be utilized only in connection with the multiple-bridging board.

Each of the jacks in the bridging board consists of two brass rings and three brass springs, as shown in Fig. 27, the corresponding parts of each jack being connected to the same wires of the circuit. The line drop *n* is self-restoring; it contains two windings, one for opening the shutter *o* upon current being sent in from the subscriber's instrument and the other for closing the shutter when this call is answered by the operator, current in the latter case being supplied by the battery *h*, which also furnishes current for the busy test.



FIR. 28.

The operator's circuit on a multiple-bridging board is shown in Fig. 28. The answering and calling plugs, *A* and *C* respectively, are somewhat different from those on the transfer board, each having besides the tip and shank connected to the operator's circuit, a brass sleeve *s* insulated from the other parts of the plug. When the plug is introduced into a jack, as shown in Fig. 27 by dotted lines, this sleeve electrically connects the two springs at *i* and thus joins the battery *h* to the outer rings of all the jacks for the busy test. The outer rings of the jacks serve no other purpose and are therefore insulated from the plugs when inserted, by a hard rubber collar e, Fig. 28, which fits around the shank on each of the plugs.

The operator's listening key *J*, Fig. 28, consists of three springs, two of which, *r* and *o*, may be made to connect the talking circuits *t l* across the connecting cord circuit at *v m;* the third spring *n*, insulated from but attached to the spring *r*, is grounded at *h*. When the listening key is closed, the spring *n* therefore comes in contact with the wire *b* and completes the grounded circuit through the battery *d* and that winding of the clearing-out drop *w* which restores the shutter *u*, the shutter *u* having been previously opened by the final signals from the subscribers formally connected. The clearing-out drop *w* is constructed in the same manner as the line drop *n*, Fig. 27, and both are inclosed in iron cases for the prevention of cross talk. The resistance of the main coil in each of these drops is 600 ohms, while that of the restoring coil is but 50 ohms.

The remaining apparatus in the operator's circuit will be easily recognized: the ringing keys *f* and *g;* the ringing generator *i*, which is usually less than 1 kilowatt in capacity, and develops alternating current at from 100 to 125 volts and at about 16 cycles per second; the operator's transmitter *k;* induction coil *p* and head receiver *q*, the latter of which is connected between the two halves of the secondary winding on the induction coil and grounded at *y* to provide for the busy test. The method of operating the multiple-bridging board is the same as that already given for the multiple-series board. Multiple switchboard sections have each a length of about 6 feet, providing therein for three operators' positions.

The arrangement of apparatus in each section of a multiple switchboard is practically the same as that on a transfer switchboard; the principal change results from the multiple jacks which are placed in a panel below the line drops. In conclusion, it may be stated that small incandescent lamps of ½ candle-power each are sometimes used on multiple switchboards in place of the magnetic drops, for signaling purposes. When used on the multiple-series board they are cut out similar to the drops, but when used on multiple-bridging boards they are cut out by means of relays; in the latter case, being connected in local circuits, they are not affected in brilliancy by the resistance of the line to which they are attached. Although requiring more current than the visual line drops, they are more effective, and improve the appearance of the switchboard.

FATAL SHOCK FROM TAPE-LINE.

Jeffries Donohue and Harry Ripson, employes of the Northwestern Telephone Exchange Company of Minneapolis, were killed by an electric shock in a peculiar manner a few days ago near Stillwater, Minn. The accident occurred at the junction of the telephone line and the 30,000-volt power line of the Apple River Power Company. With a small linen tape-line in his hand, Ripson climbed the telephone pole to measure the distance between cross-arms. He tossed the end of the tape-line over the transmission wires, and when he again took hold of the tape death resulted almost instantly. Donohue, who stood on the ground and held the other end of the tape-line, was also killed. The hands of both men were scorched and Donohue's feet were pierced as if from small shot. In searching for the cause of the accident fellow-workmen discovered that extending longitudinally through the tape-line were small steel wires which served to keep the line from stretching, and which no doubt conducted the fatal current.

The United States government is considering the advisability of establishing telephones throughout the forest reserve in the state of Colorado.

In the Financial Field

CUYAHOGA STATEMENT FOR EIGHT MONTHS.

FOLLOWING is the financial statement of the Cuyahoga Telephone Company for the month of August and for the eight months ending with August, compared with the same periods of last year. The statement indicates that the company has been making some large gains in gross earnings, but that its increase in operating is also very large. Its bond interest has increased very materially as a result of the increase in its bond issue. These increases in operating expenses are due to the very large amount of money which it is necessary to expend in connection with the new business which the company is constantly getting. The increase in fixed charges relates to the money which has been spent for capital account on account of additions to the plant. It will be noticed that there is a gain of $2,463 in surplus for the month of August and that there is a gain of $23,236 in surplus for the eight months. It is now possible to form some idea what the company will actually do this year.

The surplus for the eight months is $63,561. The surplus for August is $8,051. Say that the company will make this same surplus for September, October, November and December, and you have a total of $95,561. In order to be absolutely fair add $5,000 to this surplus and say that the surplus for the year will be $100,000. There is outstanding in the neighborhood of $800,000 six per cent preferred stock which requires the sum of $48,000 a year for dividends, which, subtracted from $100,000, leaves $52,000 available for common stock. From this amount $15,000 must be distributed among the employes in the way of profits as a result of the arrangement now existing, leaving $37,000 for common stock, or about 2½ per cent on the outstanding issue.

	Aug. 1905.	Aug. 1904.	Increase
Gross earnings	$ 50,528.34	$ 37,458.23	$13,070.11
Expenses and taxes	28,827.68	21,664.00	7,163.68
Net earnings	$ 21,700.66	$ 15,794.23	$ 5,906.43
Charges	13,649.19	10,206.38	3,442.81
Balance	$ 8,051.47	$ 5,587.85	$ 2,463.62

Fiscal year from January 1st to August 31st:

	1905.	1904.	Increase.
Gross earnings	$373,665.48	$277,409.04	$96,256.44
Expenses and taxes	211,112.01	155,994.50	55,117.51
Net earnings	$162,553.47	$121,414.54	$41,138.93
Charges	98,991.76	81,089.06	17,902.70
Balance	$ 63,561.71	$ 40,325.48	$23,236.23

KEYSTONE TELEPHONE NEWS.

Keystone Telephone people say, respecting the $50,000,000 New York Independent telephone company and the reports of a large Independent telephone combination, that at present there is no definite arrangement for the Keystone company to enter any consolidation of companies, nor any option given on the stock. They do, however, emphasize the probability of the Keystone's being considered at the proper time, when it comes to a consolidation of the Independent companies.

In support of this remark is made the claim that the Keystone is the largest individual Independent company in the country. Philadelphia is important as a center for trunk lines for a long-distance system, and with so large a business already established, an Independent combination could scarcely do without it.

Plans for a merger of Independent companies of this country, with a view to establishing long-distance systems, have been under consideration during the past year. General Manager Wilson, of Keystone, attended some of these meetings.

A telephone authority gives the following as approximate figures for the number of Independent telephones in use in some of the larger cities of the country, Philadelphia leading them all:

Philadelphia	17,000
Los Angeles	16,000
Pittsburg	15,000
Cleveland	15,000
Minneapolis and St. Paul	14,000
St. Louis	13,000
Kansas City	11,000
Chicago (business telephones only)	10,000
Indianapolis	9,000
Louisville	8,000
Buffalo	7,600
Rochester	7,500
Seattle	6,500
Grand Rapids	6,200
Columbus	6,000

In Pennsylvania there are more than 30 cities having over 10,000 population each in which there is an Independent telephone company. No other state except New York has so many cities of this size in which there are Independent companies.

By some authorities it is figured that there is $250,000,000 capital invested in the more than 5,000 Independent companies. The capitalization of the forty-four Bell companies, including the parent company, the American Telephone and Telegraph company, is figured at over $600,000,000 in stocks and bonds.

QUINCY COMPANY SELLS ITS BONDS.

The Quincy Telephone Company of Quincy, Ill., which procured its franchise about a year ago, has sold its $500,000 issue of bonds to a St. Louis syndicate, which includes J. H. Murphy, a broker, and Charles Sutter, who recently assisted in consolidating the car concerns, representing a value of $50,000,000. The firm of Herman & Schatzman, brokers of Quincy, is understood to be financially engineering the project. The work of construction will begin immediately, and is expected to be completed by next April. Long distance connections will be made with St. Louis and Chicago, and about 5,000 telephones will be installed.

GRAND RAPIDS, MICH., STATEMENT.

The annual report of E. B. Fisher, secretary of the Citizens' Telephone Company of Grand Rapids, Mich., for the year ended June 30th makes a very creditable showing for that company. The net growth of the entire system, local and long-distance, was 3,404 telephones, making the total number of instruments in the system at the end of the year 19,742. Outside of Grand Rapids the system embraces 80 exchanges, of which 21, with 883 subscribers, were added during the year named. Mr. Fisher says: "The net growth of the city exchange was 1,028 telephones. This remarkable increase proves that the new automatic service is giving satisfaction to its users. This will become more apparent to you when it is stated that the net addition to the city exchange during the last six months of the fiscal year was 591 telephones, as compared with the 437 of net growth in the first six months of the year; and this large growth, it should

be remembered, is at prices for service which are $6 per annum higher for both business and residence telephones than the prices charged by our competitor in Grand Rapids."

The long-distance lines were increased during the year by about 25 per cent, so that on July 1st there were 1,352 miles of poles, 1,948 miles of copper circuits and 1,060 miles of iron circuits.

The earnings for the year were $418,441, an increase of $75,049 over the preceding year. Operating expenses were $105,125; maintenance, reconstruction and depreciation, $101,882, and dividends of $139,552 were paid. The capital stock of the company at the close of the year was $1,910,985.

YORK COMPANY DOUBLES STOCK.

The stockholders of the York, Pa., Telephone Company at a recent meeting voted unanimously to increase the capital stock of the corporation from $200,000 to $500,000 for the purpose of placing the wires of the company's system underground, making important rural extensions to the system, and adding general improvements. Charles H. Lidlie, electrical engineer, of St. Louis, Mo., has been engaged to prepare plans for a conduit system for the county.

FINANCIAL NOTES.

The Ideal Telephone Company of Yates City, Ill., has increased its capital stock from $3,000 to $5,000.

The Hunter Telephone Company of Hunter, N. D., has increased its capital stock from $5,000 to $15,000.

The Fairfax Telephone Company of Fairfax, Mo., has increased its capital stock from $18,000 to $24,000.

The Boynton Telephone Company of Pleasant Plains, Ill., has increased its capital stock from $30,000 to $60,000.

The New Ulm Telephone Company of New Ulm, Minn., has increased its capital stock from $50,000 to $100,000.

The Steuben County Electric Telephone Company of Angola, Ind., has increased its capital stock from $5,000 to $100,000.

The Texas Consolidated Long-Distance Telephone Company of Dallas, Tex., has increased its capital stock from $30,000 to $60,000.

In order to extend its system, the Whitecloud Telephone Company of Whitecloud, Kan., has increased its capital stock from $75,000 to $150,000.

The members of the Citizens' Telephone Company of Dunkirk, Ind., recently held an important meeting in this place and dividends were also declared.

The directors of the Farmington Valley Telephone Company, New Britain, Conn., have declared a semi-annual dividend of 3 per cent, payable October 1.

The directors of the Columbus Telephone Company of Hudson, N. Y., recently declared the fourth quarterly dividend of 1¼ per cent, payable October 1.

The Fairbury Telephone Company of Fairbury, Mo., has increased its capital stock from $30,000 to $50,000, and will make some important improvements and extensions.

The Wood County Telephone Company of Bowling Green, Ohio, has increased its capital stock from $200,000 to $300,000, the increase being 6 per cent preferred stock.

The Steinauer Telephone Company of Steinauer, Neb., which was incorporated in 1900, has amended its articles of incorporation, increasing its capital stock from $3,000 to $25,000.

Between $50,000 and $60,000 will be spent in the installation of a complete telephone system for Ensenada, Cal. The work is under the direction of J. D. Cameron of Los Angeles.

The directors of the South Bend (Indiana) Home Telephone Company recently held their semi-annual meeting at South Bend, at which time a semi-annual dividend of 1 per cent was declared. This does not represent the earnings of the term, which were at a much better rate, but the company is devoting the larger part of its profits to the improvement of its property.

The Citizens' Telephone Company of Corning, N. Y., is making preparations to reconstruct its system and enlarge its business, and expects to expend between $35,000 and $40,000 for the purpose.

The Independent Telephone Company of Portland, Ore., has sold $1,000,000 worth of bonds, the money to be used in the construction of a long-distance line between Portland and British Columbia cities.

At the regular monthly meeting the directors of the Newark, Ohio, Independent Telephone Company declared the regular quarterly dividend of 2 per cent, payable October 1. Three per cent semi-annual dividends on preferred stock are paid in January and July.

It is stated that the party of Toledo, Ohio, capitalists who some months ago promoted the Cuyahoga telephone deal, are negotiating for the control of the Independent Co-operative Telephone Company of Detroit, and that the property will likely pass into their hands.

The Madrid, N. Y., Telephone Company has certified to the Secretary of States that the amount of its capital stock has been increased from $10,000 to $15,000, consisting of shares of $100 each. The amount of capital stock paid in is $9,900. The certificate is signed by Frederick J. Merriman and G. P. Horsford.

The directors of the Toledo, Ohio, Home Telephone Company at a recent meeting decided to increase the wages of all its operators about 10 per cent. The increase was entirely voluntary and is greatly appreciated by the employes. The directors also declared the customary 1 per cent quarterly dividend; the books closed October 1 and reopen October 10.

The Paducah Home Telephone Company of Paducah, Ky., which bought over the properties of the People's Independent Telephone Company, according to its manager, will spend $50,000 in improving the local system. Arrangements are being made to connect with other Independent systems, so as to give the Paducah system a first-class long-distance service, something it has never had.

At a meeting of the board of directors of the Columbus (Ohio) Citizens' Telephone Company, the regular quarterly dividend of 1 per cent was declared on the common stock. This will make three regular dividends which have been paid on this stock. In addition, before the beginning of the regular dividends last March, four others had been paid on the common stock, one of 8 per cent and three of 3 per cent each.

At the annual meeting of the Interstate Telephone and Telegraph Company of Aurora, Ill., the seventeenth regular quarterly dividend of one per cent was declared on the entire capital stock of the Interstate company. The report for the fiscal year ending June 30 also showed an increase of nearly $20,000 in the surplus over the above fixed charges, including interest and dividends, which was considered by the full board to be very satisfactory.

A special meeting of the stockholders of the National Telephone Company of Wheeling, W. Va., has been called by Secretary Will C. Handlan for the purpose of considering a resolution authorizing an increase in the capital stock of the company and also a resolution authorizing the issuing of bonds and providing for the retiring of outstanding bonds. The increase of the capital stock is contemplated to enable it to branch out and prosecute the various extensions that have been contemplated for some time.

The Martin Telephone Company, Llano, Texas, which recently increased its capital stock from $10,000 to $20,000 and changed its headquarters from Johnson City to Llano, is planning extensions to form a junction with the Roberts

Independent Telephone Company at Midland and the Riddle Independent Telephone Company at Weatherford, which when completed will give a complete system of Independent telephone lines from Austin to all points west and northwest in Texas. Among the stockholders of the company are Otto Ebeling, M. H. Reed, R. H. Evans of Marble Falls, Texas; David Martin of Llano and Levi Crownover of Blanco, Texas.

The Northville Telephone Company, Northville, Mich., recently held its annual meeting at this place and elected officers as follows: President, Dr. J. M. Burgess; vice-president, F. S. Neal; secretary, M. A. Porter; treasurer, R. C. Yerkes; directors, A. K. Carpenter, W. G. Yerkes, W. H. Yerkes, R. H. Porter; manager, M. A. Porter. A 10 per cent dividend was declared and the annual report showed the company to be in excellent condition. The company operates about 166 miles and has 211 telephones in service.

Plans have been under way for some time for the reorganization of the Citizens' Telephone Company of Terre Haute, Ind. It is understood that additional capital has been taken in that will be amply sufficient to make the company one of the strongest Independent lines in this section. The principal stockholders of this city are W. P. Ijams, A. Z. Foster, S. R. Hamill, Charles R. Duffin, Henry Miller, Alvin M. Higgins, who will retain their interests, and the additional capital that comes into the company by its reorganization will attach the local company to one of the strongest Independent telephone concerns in the United States, insuring not only improvement of service, but also extensive additional connections. W. P. Ijams is president of the company.

General Manager Wm. H. Bryant, of the Home Telephone Company of Mobile, Ala., which recently provided for a long-distance service and extensive improvements by issuing bonds to the extent of $300,000, announces that his company has absorbed the Eastern Shore Telephone Company, which operates lines to Bay Minette, Magnolia Springs, all eastern shore resorts and as far south as Shell Banks. The company will at once expend $20,000 in improving the system, which will give them another link to the proposed long-distance service to be established by the company and which now extends as far south as Decatur. The improvements contemplated will include five trunk lines. The absorbed system will be operated from the main office in this city. Reconstruction of the line will begin at once and be rushed through to completion.

INSPIRED BY THE TELEPHONE.

The funny complications and amusing situations that occur in the actual routine of business on a telephone line would doubtless furnish endless material for the newspaper writer if he would take the time and go to the trouble of looking them up—material that would depict the humorous side of the "hello" industry more to the exciting of the reader's risibilities than any of the stories, paragraphs and verses that are the creation of the writer's imagination. The possibilities of the the telephone as a subject for the exercise of the creative genius of the reporter or the funny man of the press are too many and varied, however, for him to undergo the task of hunting up the real incidents, and he loses no opportunity to "think up" something that might have occurred in the experiences of the operator, the subscriber, the manager, or even the lineman, and the subject is so ever alive and popular that he finds no difficulty in finding a ready and profitable market for his "story." Thus, a New York Herald reporter relates the following as an incident in the metropolitan local telephone service:

"You seem to have changed your mind," said the clerk. "When you were in here six months ago you asked for a telephone number that could be remembered easily."

"I know that I did," replied the visitor, bitterly. "Six months ago I was a blithering idiot. I've learned a good deal since then. I've had a telephone for six months. I want a combination of figures now that my best friend will forget two minutes after he hears it."

"Won't that be rather inconvenient?" asked the clerk.

"Inconvenient?" echoed the complainant. "I hope so—for other people. It can't be as inconvenient for us as our present number. Two thousand—that's what our number is now. A baby a week old could remember that. There is just one fact that is universal knowledge about our house, and that is Brown's telephone number. There are twenty-six families in the building, not counting the janitor. All those families have telephones, but they might just as well not have any. They don't use them; they use ours. Nobody can forget ours. All our neighbors are on to that. When they want their friends to call them up they never think of giving their own number; they just say: 'Oh, don't bother to look us up. Just call up "Brown, 2,000"; you can remember that. The Browns live on the fourth floor. They are very accommodating and will call us to the telephone.'

"So they call up 'Brown.' We are accommodating. For the last six months we have attended to the marketing of those twenty-six families and have arranged their card parties and weddings and funerals. Half the time the wire has been so busy that we couldn't get a shy at it for ourselves. Even when my wife's grandmother died we didn't get the news for six hours because our neighbors were using the telephone. Last week the rush got so heavy that I had to hire a boy to take care of the messages. That don't pay, consequently I want a new number."

The clerk was very nice about it.

"I don't blame you," he said. "I will give you 17349. That will head them off. We don't get many complaints as serious as yours. However, we receive many requests for a change of telephone numbers, on one charge or another. Usually the dissatisfied subscribers want a number that can be more easily remembered. The hundreds and thousands are most popular. After them, double or triple combinations, such as two twos or three threes are in demand. Those numbers that can be remembered by means of some nonsenical jingle that applies to them are also favorites. Occasionally we receive a complaint from a subscriber who is out of sorts because some one of the same name or the same business has the same number on some other exchange. Confusion in calls and consequent disarrangement of business plans are the result of that similarity.

"A month or so ago our whole force was called upon to settle the professional troubles of two doctors. One doctor was a woman and the other a man, but both were enrolled as M. E. Rhodes, and their telephone number was 2700 on different exchanges. Somehow, no one could ever get those numbers straight. The woman's patients made appointments with the man, and his with her. The woman, however, got the best of it, and in time she took over most of the man doctor's practice. Then was when he asked for another number.

"Another confusing case was brought to our notice only last week. A theological seminary and a brewery up on Columbus avenue had the same number. The managers of both institutions kicked. The superintendent of the seminary said he was mortified half to death because every day or two somebody was bound to call up and ask him to deliver 400 kegs of beer that afternoon, and the foreman of the brewery complained that he was equally embarrassed when called upon to answer inquiries relative to fresh consignments of hymn books and missionary tracts. Of course, that was an exceptional case."

Decisions Affecting Telephony

G. W. HAND

AGREEMENT TO PAY PER CENT OF GROSS EARNINGS FOR PRIVILEGE OF OCCUPYING STREETS IS BINDING IN MISSOURI.

A suit between the city of California, Missouri and the Bunceton Telephone Company resulted from the following facts. The city had entered into a contract with the defendant company in 1898 whereby for the privilege of erecting its lines of telephone on the streets of said city it agreed to pay to the city five per cent of its gross earnings as compensation for the rights conferred. This contract was entered into by both parties, the franchise granted, a bond obligating the defendant to pay the above per cent was duly filed with the proper municipal authorities and for some years the per cent was regularly paid to the city and a proper report made of the business. For various reasons which it is unnecessary here to relate the defendant considered that it was not under duty bound to pay this per cent and refused to continue doing so. The Court of Appeals of Kansas City has disposed of the controversy in the following manner so far as the right of the city to enforce this agreement is concerned: "The general power of the city to take the action had in this case, of letting the right for the construction and operation of a telephone company within its limits to such party as would secure the right at a public bidding of so much of its gross receipts, was considered by us in the case of Plattsburg v. People's Telephone Company (88 Mo. App. 306). We refer now to that case for the reasons upon which we base our decision. But many technical objections have been urged by appellant against the judgment rendered. Among others is one as to the validity of the enactment of the ordinance. We regard that it was properly enacted under the charter of the city. But it seems to us that objections to the ordinance which defendant accepted, and of which it has received the full benefit, and with which it renders full compliance, and under which it still operates, come with ill grace from the party thus acting. It is among defendants objections that other companies have been given the privilege of using the streets for telephone purposes without charge. It need only be said of this that there was no attempt to give the defendant the exclusive right to the operation of a telephone. We therefore do not see that it can make any difference to defendant, under its contractual rights, that other companies are allowed to operate without paying a per cent of their earnings to the city."

City of California v. Bunceton Telephone Company, 87 S. W. 604.

EMINENT DOMAIN IN IOWA.

A case decided by the highest court of the above state in which one Sisson and the board of supervisors of Buena Vista County were respectively plaintiff and defendant contains some instructive language on this question. It is said in substance that the public use for which private property may be taken under the constitutional provision, declaring that property of a private character shall not be taken for public use without compensation, must be a use which will inure to the benefit of the parties concerned, considered as members of the community, and not solely as individuals, which benefit must be common in respect of the right of participation, but without necessarily affecting each user in precisely the same manner. The constitutional provision allowing the taking of private property also says that adequate compensation must be first made or secured to be made to the owner. The plaintiff in this case sought to have the court rule that this compensation must be advanced in order that the requirements of the law be fully met. This view was not sustained. "As it seems to us, a mere reading of the provision of the constitution in question is sufficient to warrant the conclusion that within the contemplation of the makers of that instrument, conditions might arise making it desirable to accomplish a taking by the state of private property in advance of the fact of actual payment. And apparently it was not conceived that any natural right inherent in private ownership forbade the authorization of such taking. It was conceived, however, that justice to the owners of private property required, that, in case of legislative provision being made for the exercise of the right of taking, the right to compensation should be safeguarded by making such taking conditional in all cases on the giving of security. . . . Within, our view, it follows therefrom that an act which authorizes a taking for public use without payment of damages in advance, but which makes requirement that the damages shall be secured, and thus made certain of future payment, is in direct harmony with the constitutional provision, rather than being at variance with it."

Sisson v. Board of Supervisors, 104 N. W. 454.

ILLEGAL INCORPORATION BY COMMITTEE OF SUBSCRIBERS.

Subscribers to a proposed corporation appointed a committee of nine to prepare proposed articles of incorporation. The committee was unable to agree, four refused to proceed and reported back to the subscribers who agreed with the minority of the committee. The remaining five prepared articles of incorporation and became the Mt. Carmel Telephone Company. Thereafter the majority subscribers repudiated the action of the five members of the committee, executed articles of incorporation and became the Mt. Carmel & Flemingsburg Telephone Company. In a suit before these companies the highest court of Kentucky has held that the committee was merely the agent of the subscribers and hence, when the articles prepared by the five members were repudiated by the majority of the subscribers, the five were not authorized to proceed and bind the remaining subscribers by their incorporation proceedings.

Mt. Carmel Telephone Company v. Mt. Carmel & Flemingsburg Telephone Company, 84 S. W. 515.

NO EXCLUSIVE FRANCHISE FOR USE OF STREETS IN ALABAMA.

The following language was recently used in a suit between two competing electric light companies operating in the county of Montgomery of the above state wherein one company sought by injunction to shut out the other for various irregularities in procuring its franchise: "As to the results to the parties from retaining or dissolving the injunction, the allegations of the bill and amendment and the answer thereto show that both parties were engaged in the same general business, incurring like burdens and expenses, so that the indications are that the injury resulting to the complainant from the dissolution of the injunction would probably not be greater than those which would result to the respondent from retaining the same. Neither company has any special rights in the streets, except as granted by the municipal authorities, and when a telegraph, telephone, or other electric company acquires rights over streets, it does not acquire a distinct part of the land, such as the right of way of a railroad company, over which another company cannot pass without instituting condemnation proceedings; but its rights are subject to the rights of every other com-

pany to which the city may grant the right to string its wires over the streets, subject only to the right of the first to be protected from injury by the stringing of other wires so near as to injure its property or prevent its discharge of its duties to the public."

Montgomery Light & Water Power Company v. Citizens' Light, Heat & Power Company, 38 Southern, 1026.

INJURY FROM DULL PIKE POLE WHICH WAS ORIGINALLY FURNISHED IN GOOD CONDITION.

A California case involved the following facts: A lineman named Towne in the employ of the United Electric & Power Company was engaged with three others in taking down defective electric light poles, and to perform this work the plan was to brace each pole, as the gang came to it, by means of pike poles set around it, when one of the party would ascend the pole and loosen the wires, after which he would descend and the pole could then be taken down in whatever manner was most convenient. Towne had ascended a pole after the pikes had been set and had loosened the wires when the pole fell to the ground carrying him with it and causing him serious injury. The sudden fall was due to one of the pike poles having become blunt and thus limiting its penetration into the decayed pole, slipping off by the weight of the lineman and its own weight and being decayed at the bottom it fell to the ground. The claim against the company was that it had been negligent in allowing the pike pole to become dull and blunt. The above statement of facts will make clear the following statement of the law in this state on the question presented. "It was the duty of the defendant to furnish suitable tools and appliances to plaintiff and his fellow servants for the work which they had in hand. The court found that the pike-poles furnished 'were of the character and construction usually and customarily used for the purpose for which the same were furnished.' Therefore there was no negligence in furnishing tools with which the work was done. If the pike poles became dull by reason of use, it was as much the duty of the plaintiff and his fellow servants as it was of the defendant to have had it sharpened and repaired, provided the means were furnished by the defendant with which such repairing could be done. It is the duty of the employer to use ordinary care and skill, and it is certainly the duty of the employe to know whether the tools with which he is working have become dull or in need of sharpening. Having eyes he must use them and being informed he must act upon the information. If one of the pike-poles furnished by the defendant had had the point broken off by the plaintiff and his fellow servants in taking down the very first pole they came to, and they had used such pike-pole with the broken point on the next electric light pole, and damage had been caused thereby, would it have been the negligence of the defendant? Would defendant have to have one man employed for the special purpose of watching the points of each pike pole, another for the purpose of watching the steel points attached to the shoes of the climber of the poles? We think that a reasonably prudent employer would have performed his duty by furnishing proper pike poles, and that a reasonably prudent employe would not use a pike pole after the point had become dull and blunt."

Towne v. United Electric Gas & Power Company, 81 Pacific, 124.

WHAT IS A SUFFICIENT INSPECTION IN MICHIGAN.

A personal injury case brought by one Wells Warren of Port Huron against the City Electric Railway and a certain telephone company, both operating lines of wire on the same streets, is authority for the rule on this question in Michigan. The plaintiff, a boy of eleven years of age, was seriously injured by coming in contact with a live telephone wire, which lay upon the ground in a public street. The testimony went to show that the telephone wire received its dangerous current from a trolley span belonging to the electric company, through its being pressed down upon the span wire, by the limb of a tree, which was broken by a severe storm the previous evening, the break being at a considerable distance from the point where the wire fell. Action was brought against both companies. The principal question in the case related to the fact whether there had been a sufficient inspection of the wires by the electric company. The Supreme Court in disposing of this subject said in substance: "The question of the nature and frequency of inspections was for the jury, unless it could be said that the inspection was conclusively shown to be reasonable. Whatever may be said of the nature of the inspection in the case, we cannot say as a matter of law that the inspection proved was reasonable and proper. That is a question for the jury, depending as it does upon the condition of the line, and the nature of the danger to be feared. The frequency and care required in inspections depend much upon the character of the apparatus, or machinery, or other agent from which danger is feared, and as its destructiveness and danger is increased, the duty of care increases. In other words the degree of hazard attending the use of a dangerous article has a direct relation to the care which is requisite in its use. Electricity is to be classed with gunpowder, dynamite, and other treacherous and destructive agents, of whose dangerous qualities we may take judicial notice, as well as of the fact that society recognizes them, and acts accordingly. No prudent man handles these things with a low degree of caution."

It will be recalled by a review of recent issues of TELEPHONY that many cases from various states have been discussed in this department in which the degree of care required by electric companies has been determined and the rule of law regarding this very important question laid down. The Michigan courts have not before found it necessary to declare the rule of law on this subject, and we quote the language used in fixing the rule as it will hereafter be for Michigan: "We find it unnecessary to say, as some courts have said, that the use of electricity imposes the duty of the greatest possible care. The circuit judge did not so charge, but contented himself with saying that the duty requisite was such as ordinarily careful and prudent persons would exercise in dealing with electricity under similar circumstances. This was sufficiently favorable to the defendant, although it involved the idea before expressed, that the nature of the hazard is an element in determining the question. The frequency and nature of the inspections required depend in a measure upon this." It will be at once observed that the interpretation of the rule as declared by the Michigan court casts on electric companies the duty of maintaining a degree of care such as reasonable men do in dealing with electricity. In other words that care which electrical workmen of ordinary intelligence display in handling electricity is the care which the law requires and not the highest degree of care. It is very evident that the Michigan rule is decidedly more favorable to those handling electricity than the rule in those states requiring the highest care.

Warren v. City Electric Railway Company, 12 Detroit Legal News, 415.

HOW ROMANCE DISAPPEARS.

The romance of famous St. Bernard pass is giving way before the spread of modern science. Several numbered huts have been erected by the monks on various parts of the pass, where in former days snowbound and benighted travelers used to be discovered by the dogs.

These huts are connected with the hospice by telephone, and the dogs belonging to the monastery have been trained, on a number being repeated to them, to go off at once to the hut which bears that number.

Concerning Telephone Traffic

SAMUEL G. McMEEN

ONE of the individuals occupying an important relation in that group of striking personalities which made up the first generation of telephone men, used frequently to say that the mission of the organization conducting the telephone art was to furnish a high grade of service "over constantly increasing distances to a constantly increasing population."

One of the first aids toward the successful prosecution of any campaign is that the issue shall be clearly outlined.

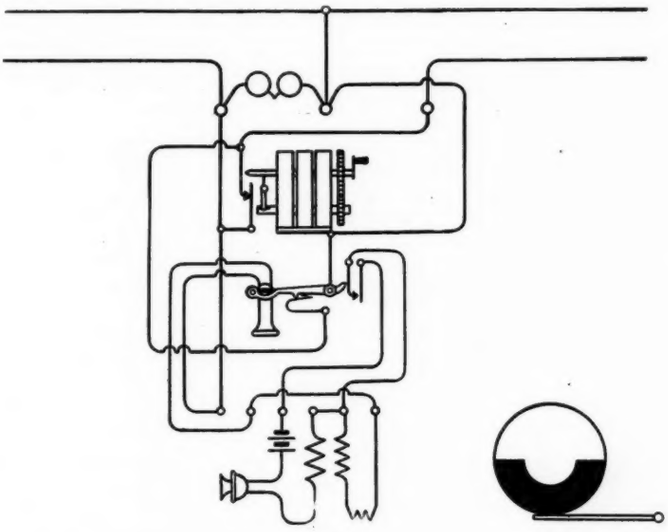


FIG. 1.

FIG. 2.

With such a conception as the foregoing for its basis, it is interesting and worthy of remark that the progress of the practical art of making telephone service was confined in its earlier decades almost wholly to the furnishing of service to a constantly increasing population in urban centers,

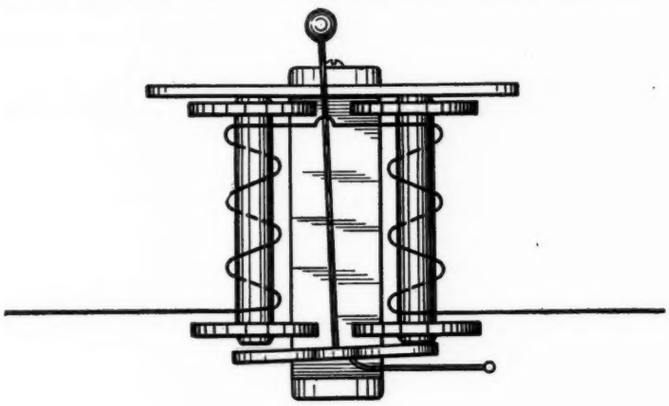


FIG. 1a.

and only a little real progress was made in the art of extending communication over constantly increasing distances.

About half of the term in which telephony has been possible expired before a really satisfactory method of general communication between towns became possible; and it is in the latter half of the term in which the now really remarkable extension has been made. Three things contributed to this possibility, these being the production of a relatively powerful transmitter, the development of the art of making hard drawn copper wire, and the abandonment of one-wire circuits.

Considering the example set by the telegraph companies, it is not remarkable that in relation to lines, equipment and operation, the circuits extending from cities into the country should have been built so as to pick up a number of towns and villages per circuit, to include their equipments in series with the line, and to arrange for unhindered signaling among them all. As there is no reason why a plurality of telegraph stations on a circuit may not call each other direct, there was assumed to be no reason why this might not be done with good results in telephone practice.

Ten or fifteen years ago, before the advent of the general use of metallic circuits for toll line purposes, the stations in a number of towns suburban to Chicago were connected upon a pair of wires in such a way that all signaling to the toll board in Chicago was done by current from the hand generators over one of the two wires, signals from Chicago for either of the stations being given over the other wire. It was over this latter circuit, with series equipment and a ground return, that conversations were held also.

The object of this rather odd arrangement was to compel any toll station desiring a Chicago subscriber, a through connection, or some other of the stations on his own line, to get the result by the assistance of the Chicago toll board. As all conversations from any toll station so arranged

FIG. 3.

would be made with the knowledge and assistance of the Chicago office, it would be simple for that office to record each transaction, and, if desired, to time the resulting message, and note the charge against the calling station. If in its monthly report the station did not charge itself with the message, or with the proper amount of money for it, the Chicago office could call for an adjustment.

Speaking generally, this experiment proved the existence of advantages. An objection to it lay in the use of two wires with only grounded circuit talking results.

It was about this time that the Carty bridging bell made its appearance. In a study to determine the best arrangement utilizing the transmission advantages of the bridging bell, and the accounting advantages of the Chicago experiment, a system of equipmnt and toll line operation was developed. This system was applied to many thousand toll stations in the territory between Pennsylvania and Nebraska, and formed the basis for the present "Center Checking" system which is the standard of the Bell company to-day.

The requirements are that no station on a multi-station line shall be able to call any other on its own line, except the terminal exchange which is responsible for the accounts of the calling station; and that this governing exchange shall be able to call any station upon the line as well as the other exchange, if the line is one which extends between two exchanges.

Fig. 1 shows the circuits of the bridging bell which satisfied these requirements. A study of these circuits will make clear that whether the receiver is on or off the hook, the

ringer is bridged between the two sides of the line; and that when the receiver is off the hook the talking circuit also is bridged across the line, in shunt with the ringer. In these particulars the conditions are of the usual bridging type.

The generator part of the set is so arranged that when the crank is turned, one wire of the pair is cut in two, and the generator is bridged across the part of the through circuit which leads toward the governing exchange. It will be seen from this that in signaling from a toll station, generator current can be sent only one way from that station.

A further peculiarity of the generator is that its shaft is equipped with a simple form of commutator, so that only each alternate pulsation of the alternating current developed in it, is sent to the line at all. This means that the current delivered, while interrupted, is unidirectional.

Co-operating with the character of current delivered by the generator, is a slight specialization of the ringer used in each such set. This is of the usual high-resistance, high-impedance, long-core type, but in addition it is provided with a light spring which gives the armature and tapper a slight but sufficient tendency in one direction; this causes the armature, after each period of ringing, to stop on the same and predetermined side. This bias spring must not be

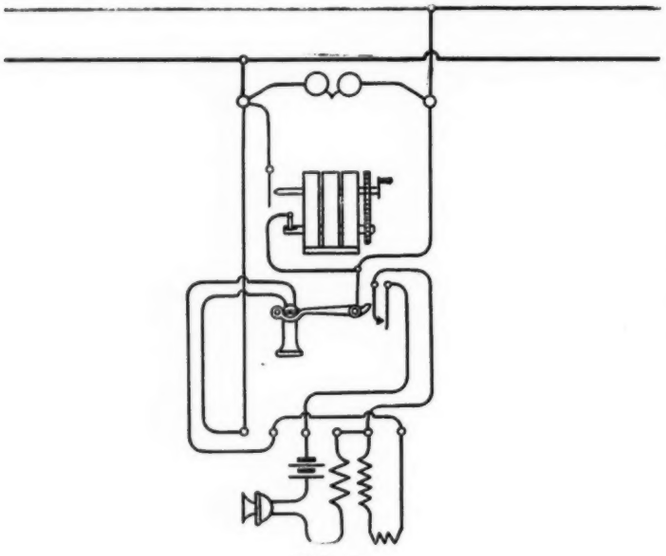


FIG. 4.

understood to be of such strength as to give the armature other than a slight tendency in one direction, as the spring is not of the order used in giving the decided bias required in pulsating ringers of selective ringing systems. Fig. 1a will indicate this feature.

In the manufacture of such bells care is taken to assemble the generators with a fixed relation of pole pieces, as, for example, to have the north-seeking poles of the generator magnets always assembled toward the front of the bell box. The windings of the armatures are connected to the bearing and commutator terminals in an unchanging fashion. With these precautions of manufacture, with some means of defeating wrong results by turning the bell crank backward, it will be seen that any currents which a station may place upon the line may be insured against giving any signal whatever to a ringer at another station on that line. This will be because the relations of things are such as to enable the pulsating currents from the generator only to pull the ringer armatures a little more firmly into the predetermined position they already occupy. Nevertheless, alternating currents sent out from exchanges will operate any of the ringers satisfactorily, as the bias tension is entirely negligible in this regard.

The detail of bell construction which defeats any effort to give a false signal by turning the crank backward, and thus sending out pulsations opposite to the usual polarity, is a contribution to this narrow phase of signaling art, ingeniously accomplished by an invention of Mr. Frank B. Cook.

A further reference to Fig. 1 shows that while the receiver is on the hook it is impossible for generator currents to be delivered to the line at all, even though such currents are developed in the armature and properly deliverd to the springs of the generator. The means are obvious in the drawing, and the reason for the provision is that on any multi-station line such as the equipment is designed to fit, a station should be encouraged—and if possible, compelled—to listen upon the line before ringing. This is all the more necessary in a line carrying such a type of equipment

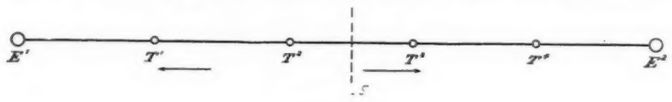


FIG. 5.

as this, because any successful attempt to ring upon the line opens one side of it as a part of the process. As it is necessary to remove the receiver from the hook before any signal can be sent, it is hoped and expected that the user will listen, and this result is found to be reasonably achieved in practice.

In the consideration of a call from a station on such a line for a subscriber in the governing exchange, or for a station lying beyond that exchange, the operations and necessities are obvious. If, however, the calling station asks for another on his own line, the call will be a reverting one—that is, turning back over the same line—and it will be necessary for the governing exchange to ring the necessary signals to get the parties together. Naturally it would be possible to do this by asking the calling station to hang up his receiver, but to insure the integrity of the signals it is found best to arrange the talking circuit of each station so that, even if the receiver be on the hook, the governing exchange can ring successfully. The method adopted in the very wide installation which has been mentioned, was to insert a non-inductive resistance winding in series with the receiver and induction coil. This resistance was of 500 ohms, being made of German silver wire, wound in the usual manner with the two inside ends connected together. In such a winding there is absolutely no impedance to voice currents, and the harmful effects of even so great an amount of mere resistance are far less than many would be inclined to imagine without careful experiment. An equivalent arrangement, and perhaps one to be preferred for certain reasons, would be the insertion of a condenser in place of this resistance in series with the talking bridge. The need

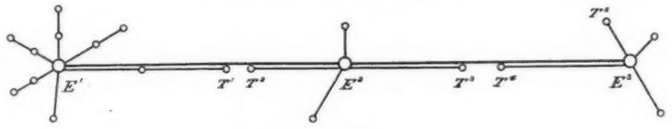


FIG. 6.

and remedy are no different from those existing in country line practice of to-day.

Fig. 2 is an end view of the generator commutator and its brush, intended to show the simplicity of the device required for preventing an alternating current from reaching the line. Fig. 3 shows the arrangement in greater detail. One of the ends of the generator armature winding is connected to the metal framework as in standard practice.

If the circuits to be equipped with these sets are to be of a single wire rather than a metallic circuit, this wire shall be connected to the extreme left hand and right hand binding posts in Fig. 1, and the middle post shall be grounded. It will be noted, although the circuits are of the bridging type, that a metallic line requires that three conductors be led into the station, and a grounded line, two conductors. Whereas,

in ordinary bridging practice, no more wires would enter the station than there are in the line at any other point. This phase of the plan is distinctly unsatisfactory, as is also the fact that one limb of the metallic circuit thus becomes slightly longer than the other unless four wires are carried into the station.

Further, it is a disadvantage to have a contact interposed in one limb of the line at each station, particularly if the bell construction does not arrange for the greatest reliability in this contact by providing platinum points and ample strength of spring pressure.

In certain quarters it has been preferred to abandon the advantage of signaling in one direction only from the station —that direction being toward the exchange exercising jurisdiction over a particular toll station—and to permit each station to send pulsating current to the line in the true bridging manner, permitting it to go where it will. This plan meets all the necessities of a line which has an exchange at one end only, as this exchange necessarily must be the governing one.

In conditions which are believed to be satisfied by an arrangement which does not break a limb of the line, but merely places pulsating currents upon it, the circuit arrangement shown in Fig. 4 will be found to be satisfactory. In this case the ringer is provided with the slight bias already described, but there is greater simplicity in the hook and generator construction.

A thoughtful inquiry into the facts of toll traffic will show that in any chosen instance by far the most of the originating calls arise in regions close around the larger towns and cities. If the items of fact be plotted carefully, the results will be found surprising to all except those who already have given such a subject examination. The surprise is briefly that "long haul" service, while bringing in a larger sum per message, is distinctly the lesser producer of total toll revenue.

Even in an exchange having the message rate method of charging for service, the number of local calls is far in excess of the total number of toll or out-of-town calls in this same period. Similarly, and for quite the same reasons, the number of out-of-town calls for nearby points, exceeds the number for far-away points.

It is a matter of much simplicity to determine from the performance of a selected toll station, just where it naturally directs its toll traffic, and it is to that point to which the circuits of such a station should be led, unless extraordinary reasons for some other arrangement may present themselves.

Fig. 5 shows an arrangement such as has been described as of wide application in the central states, and in which the condition of a plurality of toll stations strung upon a circuit between two exchanges, was the condition almost universally obtaining. This disposition of stations upon lines, however, was most natural in days when it was essential to reach the greatest number of towns with the fewest miles of wire, and when two lines between any two exchanges were the exception rather than the rule. With the increase of toll traffic, through lines between two exchanges, with no way stations, have become the natural and proper arrangement. In Figs. 5 and 6, E represents an exchange and T a toll station. Fig. 6 illustrates such a condition, which when permitted to be established, will be found most nearly to accomplish the requirements of present and future traffic. The light lines connecting the toll stations with the exchanges, may be light in wire gauge and pole construction. In some degree these toll feeders for bringing traffic to the center, are comparable to subscribers' lines. There is no reason why every essential condition of maximum transmission range may not be accomplished with a relatively low cost in these really suburban toll circuits. The main trunk lines joining exchanges, however, need to be of standard type, intelligently calculated, not only to provide successful transmission between the exchanges themselves, their subscribers, and their suburban toll stations, but with relation to their proper office in forming links in long circuits built up as occasion shall require.

In earlier days it was the duty of the toll station agent to keep his own books, prepare his own report, and transmit the funds it totaled, less his commission, to headquarters. On the establishment of the center checking system, it is possible to prepare the agent's report for him at headquarters, on the basis of the checks made by the controlling operators, sending this report to the agent as a bill, which he must pay from funds in hand, deducting his commission.

A MANILLA TELEPHONE ENGINEER.

R. R. Landon of the firm of Bryan, Landon & Company, mechanical and electrical engineers and contractors of Manila, Philippine Islands, returned home recently after a protracted visit to the United States. Mr. Landon left Manila in April of this year, and has visited all the principal cities of the country, securing apparatus and supplies for electric light plants and telephone systems. His company carries a complete line of electrical and telephone apparatus and supplies at its Manila warehouse. In speaking of the future electrical development of the far east Mr. Landon said that there was a great amount of work planned for the next year. His company will shortly open offices in Hong Kong and Shanghai, China, and devote considerable time to electrical and telephone work in China where there is a very wide field. He thought it would be but a short time until the Orient would open up a great market for American machinery and electrical apparatus of all kinds.

INDEPENDENT TELEPHONE SYSTEM GROWING.

The Independent Telephone Company of Yankton, South Dakota, has commenced work on its extension of long distance telephone line from Gayville to Sioux City connecting with the toll lines of the New State Telephone Company and the Sioux City Telephone Company's new automatic exchange just completed and owned by the business men of Sioux City. The construction work and material of the new lines is of the best standard grade and the circuits will be of copper wire. With the Sioux City connections the Independent telephone system of South Dakota will cover the greater part of the south half of the state with a total investment of $250,000, and which is owned by the three Independent companies, the Yankton company owning the lines from Yankton to Sioux Falls and west from Yankton to Tyndall; the Missouri River Telephone Company of Geddes, the lines through the counties west from Tyndall to Bonesteel, Chamberlain and Mitchell, and the Citizens' Telephone Company of Sioux Falls, to Canton, Salem, Dell Rapids and Worthington, Minnesota, and connecting with the Twin City system.

The South Dakota companies have been built up by South Dakota capital and the stockholders are all South Dakota business men and farmers of the state who have faith in home enterprise, the present and future progress of the state, and deserve the support and patronage of South Dakota people.

Questions and Answers

CONDUCTED BY J. C. KELSEY

I note that the standardization committee recommends that no more two-wire multiple switchboards be installed. Will you kindly publish the reasons for this decision?—M. C.

In spite of the recommendation of this committee, the specifications for all the late common battery installations have called for a two-wire system. There seems to be a disposition toward a three-wire multiple, in connection with a two-wire cord, but when the plug is inserted the system is two-wire in every sense of the word. As long as the plug is two way, the so-called flexibility of the three-wire multiple is a myth. The recommendation of the committee was undoubtedly prompted from the standpoint of long-distance service. It does not take hard work to see that a toll board, with its restoring features, and other auxiliaries, is necessarily a three-wire combination, because a long-distance circuit is unbalanced by the least ground connection. But from the local service standpoint the three-wire system has no advantage in transmission on any point. The bridged cut-off relay of the two-wire system actually is an aid to transmission.

The one who is familiar with three-wire systems, for instance the Bell company, which has large installations, the statement that I make will not come as a surprise. These systems keep a man busy wedging up the multiple, all the time hunting crosses. Crosses between tip and ring, between tip and sleeve, between ring and sleeve, and, what is worse, between the sleeve of line jack and the ring of another line jack, involving two lines. In the large multiple two-wire systems, I have never seen a man wedging a multiple, preparatory to hunting trouble there. That trouble does not exist.

When a body of men unqualifiedly declare for a certain thing in telephone matters, in its present unsettled condition, it is just a little bit presuming upon the gift that died with the good old prophets, who were fed by ravens, and who dallied with chariots of fire. If your confidence has been shaken slightly, just think for yourself one moment. Use common sense. Weigh one against another. Think of maintenance for three wires, as opposed to two. Are two telephone lines cheaper to maintain than three? Flexibility is one point. Locally, you can do anything with a two-wire system that you can do with a three. But when operated in connection with toll boards, the third wire becomes necessary.

I believe that the standardizing committee is doing good work. The Independents need it. I don't want to dispute with these gentlemen who are experts in telephone matters. I have been accused of trying to be arbiter of what telephone people shall do, but I decline the crown. If these members of the committee have decided against the two-wire proposition, surely they have literature on the subject which they will gladly send you. By all means, hand this question to them.

Please give a general explanation of what the larger telephone and telegraph companies of this country include, and where they are located. For instance, distinguish between Western Union, Central Union and Postal companies. What are the arm movements as signals in putting up wire by the large companies of this country?—B. F. V.

The combinations are just a little bit mysterious. The Western Union Telegraph Company is the older telegraph company, and has been in business many years. The equipment put in before the war is still in use, which may account for the number of messages which you and I have sent which are never delivered. A good motto is to send all messages collect. If you do this they will make a reasonable effort to deliver, in order to get the money. A company being reconciled to pay 800 per cent annual dividends is in serious need of money, hence their willingness to deliver a collect message. I sent a message from Lafayette to Chicago three years ago. I paid in advance, and they have not delivered it yet.

The Postal is a rival of the Western Union in the telegraph business. It has improved service but has not lowered rates. This company will deliver a paid message. The situation is like some telephone situations, in the way of service. It is queer, too. Between Duluth and Minneapolis there are both Independent and Bell lines. They do an equal amount of business. A man calls for Duluth over the Bell, waits and waits, for these lines are loaded, not with Pupin coils, but with red tape. In disgust, the man calls over the Independent lines, gets his party promptly, talks to him nicely, and an hour later the Bell operator informs him that the Minneapolis party is ready. Bye and bye, it may take the Independents longer and the Bell less time, just as the Postal may get slow, and the groggy old Western Union a little bit more speedy and, let us hope, conscientious.

The Central Union Telephone Company is primarily a telephone company, although it doesn't seem to be very busily engaged in the telephone business. This company operates in Indiana, Illinois and Ohio. The stockholders have invested in what might be called a gold brick. Had Chicago, Cleveland and Cincinnati been included this poor concern might be on its feet. These three states are in the home of Independent pioneers, and hardy people they have proven to be. The Central Union engages in the grocery business, incidentally in meat, and possibly furnishes a doctor to good, loyal subscribers.

To name all the Bell companies would take too many pages. A few will suffice. The New England Telephone and Telegraph Company operates New England, being there by divine right. In spite of its divine origin, it is said to give the rottenest service in America. Still those poor downtrodden people don't know any better.

The New York Telephone Company covers the Manhattan district. With their low (?) rates, $240 a year down, they have had a hard time and are said to be something like McCurdy's Insurance company, inasmuch as they can't find all their relatives big enough jobs. It is reported that this company provides mahogany Morris chairs for the trouble men when they loaf around the exchange.

Nearer home, the Western Telephone and Telegraph Company operates in Michigan, Wisconsin, Minnesota, Dakotas, Texas and Arkansas. These subdivided are known as the Cleveland Telephone Company, which Colonel Dickson is giving heart disease. The Michigan State Telephone Company, offices at Detroit, whose financiering is worthy of a Hyde or a McCall, for one day they failed, because they could not pay even the interest, and only a quarter after declared a dividend. That failure presumably must have increased their net earnings just $1,000 a day to do such a thing. Then the Wisconsin Telephone Company, offices at Milwaukee, whose genial president is going to give lectures on telephone subjects, to which subjects Grover Cleveland's "innocuous desuetude" may be applied. The Independent cause in Wisconsin is lost if this modern telephone Herman the Great gets an audience with the people. Let us hope the lectures are all given under the auspices of the Christian Endeavor societies. Then the Northwestern

Telephone Exchange Company—peculiar name, isn't it?—with offices at Minneapolis, operating Minnesota and the two Dakotas. To this company belongs the credit of originating the sub-licensee scheme, that beautiful parlor to which the Bell spider invites the Independent fly.

Once there was an Iowa Telephone Company. Like the French in the Franco-Prussian war, they have been driven back into the capital city. Even there they must be in a delicate condition, judging from what I saw some time ago.

Missouri and Kansas are, or have been, throttled by the Missouri and Kansas Telephone Company, with offices at Kansas City. Kansas City is their best exchange, and even this has its troubles since the "Home" started. This city has the distinction of being at one time the Bell junk shop. All second-hand apparatus was sent to Kansas City to give the good people service at $96 a year. They are now putting that same old apparatus into the Kansas and Missouri districts, for Kansas City has a brand new common battery system, installed within the last two years.

St. Louis is in the hands of the Bell Telephone Company of Missouri. Five years ago they gave the best service in the world. They can't say it now.

The Southwestern Telephone and Telegraph Company operates in Texas and Arkansas. This company does an immense toll business in connection with the cotton industry.

The Southern Bell operates a group of southern states, with headquarters at Atlanta. The Cumberland Telephone and Telegraph Company operates Kentucky and Tennessee. (If you care for details of this company, concerning their tactics, write to Colonel Tetu of Nashville, Tenn.) The Colorado Telephone and Telegraph Company operates Colorado, with Denver as headquarters. There is also the Rocky Mountain Bell, which runs up into Butte, Mont. The Sunset company operates with San Francisco as headquarters.

A farmer has been defined as one who tills the soil. An agriculturist has also been defined as one who tills the farmer. The various Bell licensees have been engaged in tilling the public. The American Telephone and Telegraph Company is engaged in tilling the Bell licenses. It keeps the local Bell companies busy with the sandbag to keep the mother pirate satisfied. This long-distance company spends thousands of dollars on a mile of toll line, for two reasons. First, the joy of spending the money; second, the excuse it gives to keep up the rates. It costs so much to build these lines, because the engineer who estimates the cost always figures high to be safe, and then, to defend his professional reputation, spends the whole amount to a cent. This pride costs money.

With all their fine lines, it is a hard job to try to talk to a Chicago party from such towns as Pekin, Princeton, etc. What is the use of a fine line when they choke voice currents to death somewhere in Chicago? Choking the public has not only affected their financiers, but even the technical staff takes delight in choking the public's feeble voice currents.

About arm movements, I am unable to say. Each company has signals, but I can't enlighten you.

What is a way of connecting a magneto exchange to a central energy exchange? In our town the Bell company has installed private branch exchanges, common battery. There are some of these private branch subscribers who desire to connect the local battery lines of the Independent exchange to this common battery private branch exchange. The Bell company claims that it is an electrical impossibility, and, besides, they won't allow it anyway.—A. B. C.

If it were an electrical impossibility to connect a local battery line to a common battery exchange, by what miraculous method does this Bell common battery exchange connect with its toll lines? To run those local battery subscriber lines into the Bell private branch exchange, a condenser in the larger circuit would suffice. This would prevent the line signal from being permanently energized. Then, when the telephone was taken off the hook, the local battery telephone set would act just as a common battery set. To connect the exchange and the private branch common battery exchange, the circuit shown in figure 1 might help. The local battery exchange operator would simply insert the plug into the jack, which would close contacts and make the common battery exchange signal *R* and *L*

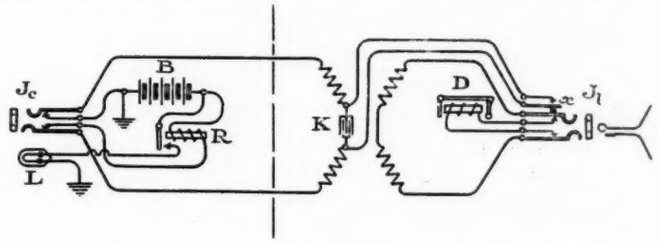
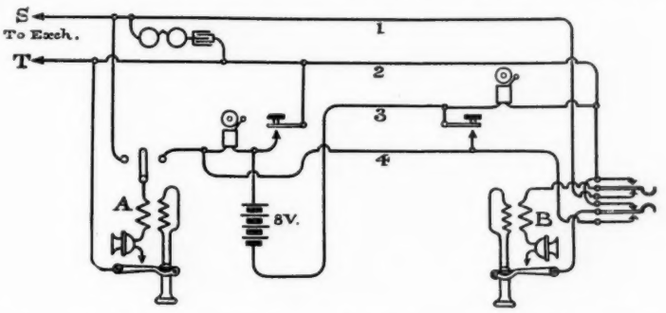


FIG. 1.

operate. When the local battery operator pulls the plug out from the trunk to the private exchange, the circuit would be opened at *X*, and the private exchange signal, *R* and *L*, would disappear. When the private branch operator wanted the local battery exchange, she would simply insert the plug into the jack *Jc* and ring up the local battery exchange just as any subscriber by throwing drop *D*. When the local battery operator plugged in, then she would throw the signal just as one of her regular private branch subscribers would do.

Some months ago I asked for a circuit for a two-station intercommunicating system using only four wires. You gave a circuit in the August issue, but it was not adapted to our exchange. I am sending a pencil sketch of the circuit which I used. You will see that the battery is fed through the vibrating bells, which also act as impedence coils, the voice currents taking the path marked



No. 2 and No. 4. The resistance of the transmitters and induction coils is enough to keep the bells from ringing during conversation. The transmission is good and everything is satisfactory. The bells on the exchange line may be placed across No. 1 and No. 2 at either station. If you can suggest any improvements, or a better circuit, I would be glad to hear from you.—W. M. B.

This circuit is submitted to our readers. Let us hear opinions.

We have a fifty-line grounded switchboard, which has been giving trouble for some time. Most of the time we can only ring a party with one cam (the rest of them seem to be short-circuited), and then sometimes all of them will work for a few minutes, but if one stops working, they all stop, except the one which has never given any trouble. What do you prescribe?—L. A. K.

This looks as if there was a poor connection between the good ringing cam and the rest, which opens and closes so mysteriously. This connection from the generator is probably wired through the keys in series, which may account for the trouble. Otherwise, I wot not.

In California it is an offense punishable by imprisonment for anyone to eavesdrop on a telephone line and then discuss the conversation.

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TELEPHONING MAKES THE VOICE SOFT.

THAT the telephone is giving the American voice a tone of culture and refinement, is the assertion of students who have investigated the subject. The result which generation of "finishing schools" have been trying to accomplish has been secured for young women in a few years by the telephone.

Hypercritical foreigners hereafter will not be able to find fault with the American voice, and call this "a nation of nasal-voiced shouters," for the telephone is taming down the so-called loud manner of the native American.

"You can't possibly convey any impression over the telephone with fine clothes," said one of the discoverers of the new human voice the telephone has created. "Suppose the society leader goes to the telephone arrayed in a $2,000 gown and her priceless family jewels. What of it?

"The rustle of the silk, the cut of the gown, the blaze of her jewels, and even her charming figure—they all are lost on the person at the other end of the line. With these conditions she must depend upon her voice for the impression she makes."

Telephone statistics show that almost 20,000,000 persons use the telephone daily, and thus the culture school has more students than any other in the world.

"My, but you are cross to-day," says the exchange girl in her modulated voice, the result partly of elocutionary training and partly of her telephone experience. This never fails to bring the irritating nervous patron of the line to a gentle attitude.

"That is the best thing to say to them," said a telephone girl. "If the men are noisy and impatient, they don't want to be considered cross, and if we make the remark that they are cross it shames them instantly."

Visitors to telephone exchanges notice one thing—the girls at the switchboards are talking almost incessantly, and yet all one hears is a low murmur. The operators have been taught to articulate carefully and they speak in a low tone.

This reform in the American voice is said to be the result of a studied effort to use the telephone to the best advantage —to convey a good impression by articulating carefully, and by bringing out the charms inherent in the human voice.

THE WONDER TELEPHONE.

DOES the average man of to-day ever stop to consider what the invention of the telephone means to him? The telephone has become the greatest of public utilities, bringing it closer to the everyday life of the people than any other invention of the nineteenth century. As given to the world the telephone was not a commercial instrument. To make it of practical use, a host of other things were necessary. Many of these did not exist; others were not then adapted to their present uses. To-day the telephone itself is one among many appliances which make telephoning possible. It is the chief factor, but the others are necessary. To the telephone engineers and inventors the world owes the present perfection of nearly all these accessories. The modern switchboard, with its thousands of miles of wire and millions of parts, the ingenious devices with which it is surrounded that it may be successfully operated, the hard-drawn copper wire of which telephone lines are composed, the cables in which hundreds of wires are encased, the telephone conduits under the city streets—all these and many other things were devised to meet the wants of the telephone users. It is by means of them that the telephone has been transformed from a plaything into a necessity in business and social life.

The telephone is indispensable alike to the banker, the manufacturer and the merchant in the city and to the farmer, the lumberman and the storekeeper in the country. Confined at first to large centers of population, it is to-day show-

ing that it is of equal value on the farm and in the forest. Telephone conversations already outnumber telegraph messages in the proportion of thirty to one, and the total number of pieces of first-class mail is little more than the telephone messages. Judging the future by the past, the telephone will soon outstrip the mails as it has already distanced the telegraph.

That the Americans are to-day the world's greatest telephone users is due to their readiness to adopt new ideas and to the efforts of the telephone companies to give telephone service to all parts of the land.

The adaptability of the telephone to special conditions is shown in many ways. The contractor of to-day who undertakes extensive construction work regards the telephone as an indispensable ally. The construction crew in the tunnel are separated from the outer world by air-locks and bulkheads; the daylight is shut out by the walls of the prison-like structure and the tons of earth and stone around it, but the workmen are at all times able to hear voices of those in the world without. To-day when the ocean liner makes fast to her dock, above the cables of hemp and steel which bind her to the shore are stretched the tiny telephone wires which place those on board in communication not only with persons in the seaport cities, but with friends and relatives wherever the long-distance lines extend. Telephone wires are connected in much the same manner with instruments on railroad trains whenever a stop of any length is made. A number of the larger steam railways of the country have installed telephone systems for their internal private needs, spending thousands of dollars for copper wire to construct circuits hundreds of miles in length, in order to place in close communication the various important division offices, one with the other, and all with the general offices of the company, thereby relieving the burden on the telegraph and train mail service; reducing traveling of officials and employes to a minimum, and expediting the business of every department, thus insuring economy in operation, time and labor.

FIRE ALARM SERVICE IN NEW YORK CITY.

THE report just issued by the fire alarm committee of the New York Board of Fire Underwriters, concerning the condition of the fire alarm service in the Borough of Manhattan, city of New York, is of great interest to telephonists, and, in fact, to public-spirited citizens in general. It is of interest to telephonists because fire alarm telegraphy is closely allied to telephony, so closely that in giving fire alarm service, telephonic and telegraphic methods of construction and operation go hand in hand. The conditions brought to light by the investigation will be of more general interest as affording perhaps the most striking example of recent years of the utter degeneration and consequent dangers that our modern civilization sometimes permits to take place in the very midst of its most enlightened communities.

The committee on fire alarm service was appointed by the New York Board of Fire Underwriters on December 21, 1904, and shortly after that time engaged Kempster B. Miller of Chicago to investigate the existing system and to make plans for its betterment in case it was found to be unsatisfactory.

Mr. Miller's report has just been made public, and, with the evidence submitted, shows a state of almost complete rottenness. It states that the system, fundamentally wrong in design, is in such bad physical condition that it must be characterized as being in an advanced state of decay. It is liable at any time to such failures as to render it wholly useless to the fire fighting department in time of greatest need. So universally bad is the condition that the only remedy is that of building a complete new system at large cost and abandoning the existing one.

The central office building, the apparatus contained in it, the entire cable system linking the central office with the fire alarm boxes and engine houses, and the fire alarm apparatus included in the boxes and in the engine houses themselves—none of these items escape a condemnation as scathing as that characterizing the system as a whole.

One might obtain, from a first reading of the report, the impression that it is exaggerated, but this impression cannot be permanent since a large amount of data and many photographs support in detail each statement of fact. The report has the unqualified endorsement of the consulting engineer, Mr. J. J. Carty, of New York, and, in addition to this, the chief experts of the New York Board of Fire Underwriters and of the National Board of Fire Underwriters, make written statements to the effect that the conditions represented in the report are in no way exaggerated, and that the recommendations made for the establishment of a new system are in accordance in all respects with good engineering, thus placing the report and its findings on what seem to be unassailable grounds.

The lessons to be drawn from this altogether remarkable state of affairs are not far to seek. The folly of making a magnificently organized fire department such as we understand New York city possesses, dependent on a system of communication so rotten that it is on the verge of falling to pieces, seems self-evident. The evils attending a state of affairs where there is a total lack of incentive which would lead to the best effort toward improvement are also apparent. In a commercially owned and operated plant there is the incentive, if only a selfish one, to give the best service possible. In a municipally owned plant such incentive must arise primarily from a sense of duty, and this alone is the most potent argument for the employment of men of high moral sense and high technical standing for the construction and management of plants having such vast responsibilities.

In reading of the conditions that are thus shown to exist in the fire alarm system of our greatest city, the thought comes with much force: In how great a degree do these same bad conditions exist in other of our large cities? The question also arises: has the art of fire alarm telegraphy kept pace with the other electrical arts? Certainly it has not in New York city, for, as Mr. Miller states, the railway, lighting and telephone systems in that city have, during the last twenty years, frequently thrown serviceable apparatus into the scrap-heap, because of improvements which rendered more economical the use of new equipment. As every one knows this is an old story in telephony, and it is common practice to abandon equipment capable of further good service in order to obtain by more modern equipment a greater efficiency. In the case of the fire alarm system in New York, however, much of the apparatus has been in use since 1869, and practically all of the equipment is of a type which long ago became unfit for any service.

USES OF THE TELEPHONE.

ALL the world is at the telephone, and somebody finds a new use for it nearly every day. The telephone goes to sea on the ocean liner and the warship; it is placed thousands of feet underground in innermost recesses of mines; it is found on snow-capped mountain peaks. Telephone wires are buried under crowded city streets and mighty rivers, and stretch to the farm and the forest. The telephone in its ordinary form may be used by anybody, except the man deprived of speech and hearing. At the same time, the telephone may be adapted to the peculiar needs of any group of people or of any industry. So many are the purposes for which the telephone is employed to-day that few in the cities know of the part it is playing on the farm and in the forest, while people who live far from the towns have little idea of the way in which the telephone is used by their city cousins.

The telephone companies, while they have been constantly

adding to their equipment and extending their lines to accommodate the increase in the ordinary employment of the telephone, at the same time have been adapting it to a multitude of uses which were unknown only a few years ago, and which are still novel to the great majority of telephone users. The manufacturers have designed instruments for use in places where ordinary apparatus cannot be employed; they have studied the methods of men in different occupations, so that unusual demands for service might be met promptly and satisfactorily, and so far as possible they have looked ahead and arranged to meet the needs of the future. Whether the new use which somebody has discovered for the telephone is to be great or small, the companies try to make it successful, believing that the soundest business policy is that which tends to give the best service to all classes of patrons.

THE WORD 'PHONE.

SOME philologist or other has likened the American language, as distinguished from that spoken in the British Isles, to a sponge, absorbing all that it needs and meets. It takes from all sources. It adopts and adapts, probably more readily than does any other tongue, the useful, odd and idiomatic words of all languages. It has borrowed "katzenjammer" from the German, at first in a spirit of jocosity, until that formidable mouthful competes for daily use with the simply expressive "jag," which has reached the dignity of a dictionary definition. It has accepted a veritable vocabulary of motoring from the French, and "garage," signifying a motor shelter, and "chauffeur," meaning the man at the levers, are now regarded as virtually native words.

In some respects this constant intake of novelties and the readiness with which Americans adopt and adapt anything that comes readily to hand to meet a case bring a chain of illogical, undefendable, anomalous results. For coupled with the catholicity of taste which permits us to take words out of the mouths of all people is a strong disposition toward abbreviation. We are notorious clippers of terminals and prefixes. We are impatient with the rules of etymology. We scoff at the laws of word-building. We use our "ins" and our "uns" regardlessly. We take no thought of the crimes we commit upon the canons of philological construction so long as we get results.

Take for instance the language of quick communication. The invention of the device for sending electric signals over a wire evoked the strictly classic word "telegraph," meaning to write at a distance. When later the apparatus for transmitting the human voice over a wire was perfected the class word "telephone" was quickly evolved, by easy analogy, to signify the sending of a sound over distance. Now the vocabulary of the "tele" and the "graph" and the "phone" is a large one, and the elements are used and twisted into scores of forms. While the devotees of literally correct speech have struggled to hold these roots to their proper development, the public has gone ahead to adjust them to its needs, to abandon them entirely when necessary for instant expression.

It is now the rare person who uses the whole word "telephone." Instead has come the abbreviation "'phone," as a verb and a noun and even as an adjective, and to-day but seldom is the extenuating apostrophe used to hint at a curtailment. So now it is plain "phone," and "phone," we are sorry to say, it will probably remain, to signify all that pertains to wire-talking. And the demand for brevity has attacked the comparatively venerable "telegraph" and "telegram"—the latter regarded by some as itself unwarranted—and Americans are rapidly adopting "wire" as both verb and noun. Here we have two striking instances of curtailment and invention, the latter blithely borrowed from the English.

What are we to do when the aerial telephone system comes into general use. It is already so common an institution that the word "wireless" is universally recognized and a few have tried to establish the name of the perfector of the system as a class word, to be extended into verb, noun and adjective at will. But "wireless" has two syllables, and the dominant taste is for short terms. The case is open to an inventor of new words. Will it come to pass that in the coming years, not far distant, we shall be talking of getting an "air" from Smith, or of "airing" Jones?

JOHN I. SABIN.

JOHN I. SABIN is dead. In very many ways his individuality was unique. In personal forcefulness he was away above the average. Almost without exception he dominated the performance of any task in which his effort was joined with that of others. He was foremost, often first, always most vivid, in presenting and driving on many conceptions whose truth was first denied, then admitted, then applied.

He was the first man to see with a clearness amounting to absolute conviction, that a development to be called sufficient requires that telephone service shall be brought within the means of the small user. His methods of modifying the particular practice of furnishing telephone service which was in vogue at the early time when he attempted such an application, have been said to be crude, unsatisfactory, hateful to the public, hurtful to the operating interests, of danger to the future, wrong in principle, and otherwise wholly bad.

Maybe so. Perhaps his way of getting at the result was the only way he could find in the conditions in which he found himself; but his early conviction that any near approach to satisfying the telephone needs of society means a ratio of telephones to population many times greater than was considered saturation when he conceived it, is truer than any of those derogatory claims.

Mr. Sabin was a big man. His opinions and conclusions were attacked by many. These two sentences say the same thing. In him, unconventionality existed in a marked degree, and it was the manifestation of this quality which caused many of his acts to seem startling to more conservative minds. But while the startled ones discussed the ethical situation in philosophic ways, he had put his plan in public operation.

At one time in the development of his ideas for the extension of telephone service to the many, Mr. Sabin kept such a number of nickels out of service in California as to raise embarrassing questions as to his influence upon the circulation of fractional currency. Before any one else, he devised and placed in practical service in an extensive way, automatic central office signals under the control of the subscriber. Before any one else he subdivided the minimum period of basis of charge for the use of long distance lines, offering those uses in periods of seconds rather than of minutes. Viewed as a phase of expansion, by placing long distance service within the reach of more people, it is seen that this is fully in keeping with his early, constant and consistent conviction.

THE TELEPHONE LETTER.

THE hour is coming when the man with a future before him will be a back number, when hope will be a sign of barbarism and anticipation the confession of imperfection. In other words, we are saving up so much time that we are getting ahead, and presently shall not have to draw on the future at all. It will be very nice, then. The business man will not have to wait to find out the success of his investments, the crown will be simultaneous with the martyrdom, and the kiss with the opportunity. If anything threatens to make us wait we shall instantly draw on the time we have saved and avoid impatience.

The very latest time saver is the telephone letter. It is a letter which goes by telephone just as soon as the mail train deposits it at the nearest postoffice. It is a Western invention, and the government is to be asked to make it a success by issuing a special stamp which, when applied to any letter, will insure its being opened and the contents sent by telephone to the addressee. It is expected to work wonders for the much-hurried farmers of the country. They will no longer have to await the tedious processes of the rural postmaster, or waste precious time in deciphering the script after receiving it. Instead of the rural delivery man's shrill whistle, the bell will ring and the honest agriculturist will not even be at the pains to open an envelope.

Of course, this is very fine, and the hardy farmers ought to have every facility for transacting business. But will the telephone letter ever be a startling and prodigal success with the younger generation. Wheat may be sold by this public method, and it is quite possible that the housewife may order her groceries from the nearest city by the reverse process, but farther than that it will not go for the simple reason that the ordinary swain does not care for saving time in the matters of real moment. A wooing has no short-cut except an elopement, and that is certainly not to be transacted over the telephone letter system. So far, the time savers have failed to shorten either aspirations of the young person or the period of gestation. Until they do, there will still be futures for a part of the world.

SWITCHBOARD POSITIONS IN DEMAND.

IN ATLANTA, Ga., a prominent firm recently advertised for a telephone girl to work at $4 a week. The next day there were 112 applicants for the place. A day or two later the same firm advertised for girls to work in its factory at wages averageing about $7 a week. Not a single applicant for the higher wages appeared. The hours of work were no longer in the factory than at the switchboard. The work was easy, consisting of packing a light finished product in paper and pasteboard boxes. The surroundings were clean, cheerful and healthful. Yet no girls were willing to take factory work, although the pay was nearly twice as much as that given to the telephone girl. It is probable that their impelling motive was grounded in the belief that a telephone girl enjoys superior advantages.

ONE JAPANESE METHOD.

IN THE *Chicago Record-Herald* of September 26th, Mr. Henry Barrett Chamberlin, in his "Stories of the Streets and of the Town," tells a story concerning the Japanese method of securing technical information for the greatest number of the Mikado's subjects at the least expense. The story would be more amusing to TELEPHONY were it a story instead of a true statement of facts. It is reproduced in full to give our readers some idea of the modern methods employed by our island neighbors in the Orient.

Edgar J. Mock is one of those who fear the "yellow peril" and with good reason. Mock is secretary of the Telephony Publishing Company, a corporation which issues a technical magazine devoted to telephone interests. It circulates wherever people talk over a wire, and until a year ago boasted a very comfortable subscription in the Japanese Empire. Then the "stop orders" began to arrive, and at the time of the last international telephone congress the publication had but one subscriber in the domain of the Mikado—Hiroshima postoffice, Hiroshima, Japan.

Try as they would, the publishers could not increase the circulation in Japan. Hiroshima postoffice renewed its subscription, but that was the net result of an energetic canvass by mail.

At the international telephone congress H. B. McMeal, president of the company, met the Japanese delegate, and the latter told him how popular his magazine was in the empire of cherries and chrysanthemums.

"Popular, is it?" growled McMeal. "Well, I like that. You fellows in Japan have a queer way of indicating your satisfaction if TELEPHONY is popular in your land. Why, we used to have a thousand or more readers in Japan and now we send just one copy of our magazine to one measly little postoffice in the entire island. I must admit that I do not understand this Japanese idea of popularity. For my own part I wish that we were not so confoundedly popular with your people if the stopping of subscriptions is an evidence."

"But you do not understand——" began the Japanese delegate.

"Now you've hit it right, my friend. I don't understand?" said McMeal.

"Well, I will tell you all about it and then you will know that you have been greatly complimented by the emperor's government. Of course you know that the telephone system, as well as other communicating methods, is controlled by the Japanese government. It's like your municipal ownership in Chicago, except that we have it and you just talk about it. Your magazine did come to many postoffices, and finally the minister of communications decided that it contained so much good technical matter and fine illustrations that he ordered it printed in Japanese and a copy of the reprint sent to every telephone exchange. Of course, when this was done it was better for us, as one translation was sufficient. It also made it unnecessary for us to have more than one copy. That is still received by the postoffice at Hiroshima, where it is translated. Then government printers and engravers reproduce it in Japanese and the magazine in Japanese gets almost twenty thousand readers. We give you credit for the original material, and so you see that you reach many people who would otherwise not be familiar with your work. I do not see how the government could pay a higher compliment to your effort. I thought that you would be pleased to know this."

McMeal doubtfully admitted that the compliment was one of the strongest that had ever been passed to him, and when he returned home repeated the story to Mock, who is also the business manager of the corporation.

"It is a great compliment, isn't it?" remarked the president.

"Fine," responded Mock. "One of the greatest I ever went up against, and it costs us a net loss of just $2,000 a year to be patted on the head by those Japs. I don't suppose that we can do anything about it, but I wish now that I had been pro-Russian during the war. Those foxy Asiatics are altogether too swift for us. I can see our finish when it comes to a commercial war in the far East. We'll be lucky if the Japs don't invade our market and take all the business before they get through. I'm against the 'yellow peril' from now on, and if I could write Russian I'd send a letter of sympathy to the Czar."

Fire Alarm Service in New York

JAMES L. SNOW

FOR some years past the alleged bad condition of the fire alarm telegraph system of New York has excited some comment, but the matter has not until recently been taken up in a thorough and systematic way. As a result it has been generally supposed by those not in close touch with the situation, that the condition was not at all critical, and that, while the system might be defective in some respects, and not thoroughly up to date, yet it was on the whole a serviceable one. There are few, therefore, even among the best posted insurance men in New York, that were prepared for the revelations which a searching investigation has brought forth.

On December 21 of last year the New York Board of Fire Underwriters appointed a committee of five prominent insurance men to arrange for a complete investigation of the system. At a somewhat later date the committee was authorized to spend the sum of $10,000 for the purpose of carrying out the investigation. Arrangements were made with Fire Commissioner Nicholas J. Hayes, and through him with his subordinates in the fire department, whereby complete co-operation would be secured.

Kempster B. Miller, of Chicago, was chosen by the committee to conduct the investigation. Mr. Miller has been engaged for the past six months in carrying out the work, and his report to the committee on fire alarm service, together with letters of complete endorsement on the part of J. J. Carty, the consulting engineer; S. H. Lockett and Greeley S. Curtis, engineers and experts for the National Board of Fire Underwriters; J. C. Forsyth, chief inspector of the New York Board of Fire Underwriters, has just been made public.

The report treats first of the conditions in the existing plant, and covers not only the fire alarm telegraph system proper, but the telephone system used as an auxiliary to connect the various department houses. After condemning the entire system to such an extent as to prove its total unsoundness, the report proceeds to outline the engineering details of a new system both telephonic and telegraphic, which is to be built alongside of the old one, and to replace it in all respects as soon as the new one can be put in operation.

The investigation bears all the evidence of having been thorough down to the minutest detail. The design, construction and operation of the central office at fire headquarters were thoroughly gone into. The suitability of the building itself and its location were subjects of careful study. The location of fire alarm boxes and also of the engine houses and other apparatus houses and in fact of all points reached by the system, were determined and plotted on maps. The fire alarm boxes were examined, their condition and construction studied, and an inspection was made to ascertain the fitness of the signaling apparatus at the various company quarters. Maps were drawn showing the number, location, size and character of the cables of the city, and a thorough engineering study made of the general layout of the cable plant. Electrical tests were made upon the cables and their mechanical condition examined in an exhaustive manner. Electrical measurements were made upon all circuits entering fire headquarters.

As a result of this investigation, which was carried out with the utmost care into every essential detail, it has been found that the fire alarm telegraph system of the Borough of Manhattan is fundamentally wrong in design and is in bad physical condition. It is not constructed in accordance with any proper engineering plans and its physical condition is so bad that it must be characterized as being in an advanced stage of decay. It is liable at any time to such failures as to render it wholly useless to the fire-fighting department in the time of greatest need.

Faulty in original design and construction, the plant has deteriorated and has been patched and repaired in its various parts as they, from time to time, become unworkable. The system long ago reached the stage where it cannot be transformed into permanent, proper working order by any further patching or even by radical repairs.

It is stated in the report that the only remedy for the present state of affairs is to establish in the Borough of Manhattan, a new fire alarm system, separate and distinct from the present one; and that when the new system has been installed and placed in working order, the old one should be abandoned and dismantled.

The reasons for this complete condemnation of the plant are stated in detail. It is shown that the central office located on 67th street east, of Central Park, fails to satisfy every one of the conditions that should be imposed upon a building for this purpose. It also shows that the central office apparatus is in itself a perfect fire trap, and that the cable approaches to the central office are of such a nature that a single accident might disrupt all of the circuits of the entire system, thereby throwing out of service the entire fire alarm system, both telephonic and telegraphic.

The outside apparatus, that is the street boxes and the signaling apparatus at the engine houses, is roundly condemned as being obsolete, in bad condition and of an altogether dangerous character. Probably, however, the greatest interest in the report centers about the cable system, and the revelations set forth in the report as to the method of routing the circuits, the general condition of the cables themselves, the complete rottenness of the cable terminals, and the methods in vogue of testing and repairing, would be unbelievable but for the undisputable evidence Mr. Miller submits in the way of exhaustive cable tests, and a very large number of photographs.

To illustrate the conditions that have arisen due to the absence of a proper fundamental plan for running the cables, it is stated that the interruption of one wire may in some cases throw out of service as many as forty-nine boxes, and that these boxes may be scattered over a very large area of the island. It is also shown that frequently long loops of wire, miles in length, are run to reach a box which could have been reached from another portion of the same circuit by the use of only a few feet of wire. Many maps are given illustrating these conditions in a forceful way.

The telephone system of the fire department, which is used as an auxiliary to the fire telegraph system, is characterized as follows:

"A telephone system connects the central office with the various department houses for the purpose of aiding in the transaction of the business in the department. This system, like the fire alarm telegraph system proper, is in such a bad condition in all respects as to warrant me in condemning it in its entirety. So bad is the transmission that it is often with greatest difficulty that the employes are enabled to talk over it at all. In my visits to the operating room where many hours were spent by me in inspecting the fire alarm apparatus and its operation, the quiet of the room was interrupted by the frequent yelling into the telephone instruments in the endeavors to transmit orders from the central office

to the various apparatus houses. . . . The telephone instruments themselves and the switchboard at the central office are not of the best and most efficient types, none of them that were inspected being suitable for an efficient telephone system.

"It is not in the instruments, however, nor in the switchboard that the main fault of this telephone system lies. It is rather owing to the intolerable circuit conditions that exist, and to the fact that the system is not planned in accordance with sound principles of telephone engineering. The telephone circuits of this system are carried in the same cables with the box, gong and combination circuits. They are dependent, therefore, on the same faulty cables, on the same tangled conditions in the terminal boxes, and on all of the other bad conditions which have been so fully pointed out in connection with the treatment of the underground cable system in general.

"Even if the cables carrying the circuits of this telephone system were in good condition electrically, and if the instruments were in good order, the telephone system would still be inefficient. The reasons for this are as follows:

"First: The telephone instruments are connected in each case between the line wire and ground. This means that all of the telephone circuits are what are called grounded circuits, since the return path for the voice currents is through the earth, rather than through another conductor. Grounded telephone circuits have long since been found unfit for commercial use in the telephone system of large cities. The many disturbances caused by electric lighting and electric railway plants, as well as the disturbances one telephone wire may create on another, are the principal considerations that make it necessary, in commercial telephone practice, to use double wire circuits. In order to further reduce the noises heard in the telephone insrtuments on account of the inductive and other disturbances, it has been found necessary to make the two wires forming a telephone circuit follow paths as close together as possible. This has resulted in the twisting of the two wires of a circuit together, where cables are used, and thus a complete immunity from foreign houses in the telephone circuits is obtained.

"Second. The other fundamental reason why the telephone service would not be good even if the lines themselves were in good condition and the instruments were efficient, is that the wires in the cables are insulated either with a saturated fiber compound, or with a rubber compound.

"Such cables as these are inefficient for telephone service, because they possess in a large degree that electrical property known as capacity. Capacity, it may be stated, operates to greatly deteriorate the quality and volume of telephonic voice transmission. The capacity of such cable as is used in the fire alarm system is not of serious practical moment, in fire alarm telegraphy, but in telephony where alternating currents—which change their direction and volume with extreme rapidity—are employed, the use of this kind of cable has been practically abandoned. Instead of this, where telephone wires are to be placed in cables, the two wires forming the two sides of the circuit are twisted together in pairs, and the insulation, instead of being of rubber or of saturated fiber, is of dry paper loosely wound upon the wires and compressed to but slight extent within its sheath. When it is said that to these two fundamental faults must be added all of the defects that have been fully described, as existing in the cable system carrying the box and gong circuits, some idea of this telephone system may be given.

"The telephone system used in connection with the fire alarm telegraph system of the Borough of Manhattan is as faulty and as fundamentally wrong as is all of the rest of the system."

In outlining the telephone system to be used to replace the present faulty one, it is recommended that the system shall consist of a telephone switchboard and complete other equipment of central office apparatus, located at the fire alarm central office. From this equipment lines radiate to all required parts of the city; in some instances these lines will carry but one station each at their termini, and in others for additional economy and without harm, one line may be made to serve two or more outlying department houses, or other stations. This practice of placing more than one station on a line is the more justifiable because the traffic on such lines from such stations in most cases will not be heavy.

A consideration of all the facts having to do with telephone systems in general, and fire alarm telegraph and telephone systems in particular, leads to the conclusion that, because of the extreme importance of the fire fighting problem a telephone system forming a part of a fire alarm intelligence system, must be of a type providing the surest transmission and the highest degree of permanence and reliability.

CANADIAN INDEPENDENTS MEET.

A convention of representatives of Independent telephone companies was held in Toronto, Canada, the meeting being called to order by Mayor Urquhart, of Toronto. Mr. A. F. Wilson, who was the moving spirit in the convention, was appointed secretary pro tem.

Among those present were the following: Alph Hoover, Markham and Pickering Telephone Company, Green River; H. S. Milne, Scarboro Telephone Company, Brown's Corners; Dr. W. Doan, C. B. Adams, W. J. Coates, Wm. Barr, Harrietsville Telephone Association, Limited, Harrietsville; A. R. Walsh, Orono, and S. S. Hallowell, East Clarke Telephone Line, Starkville; John A. Sprague and J. S. Sprague, Sprague Telephone Company, Demorestville; F. D. McKay, M. H. Ludwig and S. B. Allan, Canadian Machine Telephone Company, Toronto; George Nealy, Dorchester, A. D. Bruce, Bethesda and Stouffville Company, Gormly; F. Dagger, Ottawa; R. Y. Ellis, Toronto; D. J. Johnson, Lorimer Automatic Telephone Company, Chicago; M. McPherson, C. Heinz, American Machine Telephone Company, Brantford; J. Gibson, Stromberg-Carlson Telephone Manufacturing Company, Rochester; M. H. Oversolt, Lincoln Telephone Company, Jordan.

Mayor Urquhart referred to the recent inquiry at Ottawa into telephone matters, which had brought to the attention of the public the large number of Independent companies doing business with profit to their subscribers. He thought the future would bring about the ideal state of government ownership of trunk lines and municipal management of local branches.

The report of the committee on resolutions urged upon the Dominion Government the consideration of the nationalization of the long-distance lines, and the giving of access thereto to all telephone organizations doing business in Canada. The government was also requested to pass such legislation as would prevent any exclusive contracts between telephone and transportation companies, and compel the latter to give access to their premises to all telephones, no charge for installing a telephone in any station being permitted. Municipalities and Independent companies were warned against making special agreements with or giving exclusive franchises to any company before the final report of the special Parliamentary committee is made on the question. The Dominion Parliament was congratulated on the active interest its members had taken in telephone matters, and it was hoped that the inquiry would be continued next session.

The following officers were elected: President, A. Hoover, Green River; vice-president, F. D. McKay, Peterboro; secretary, A. F. Wilson, Markham; executive committee, Dr. Demers, Quebec; Dr. Doan, J. A. Sprague, Demorestville; T. A. E. Esterbrook, St. John, N. B.; Dr. Oches, Hespeler; Mayor Vickers, Port Arthur; Dr. Hart, Brantford; Levi Moyre, Beamsville, and C. J. Thornton, Kerby.

Digest of Telephone Patents

Conducted by Edward E. Clement

799,658—I. F. Laughlin. Telephone Signal Apparatus.

This is a harmonic signaling system for party lines. The central office is equipped with a number of pendulums *11'*, and a magnet *30*, as well as a switch *32* which the operator may open and close. At each substation on the line there is a pendulum of definite length and period, and a magnet *10* to control it. In order to call a station the central office operator moves the magnet opposite the proper pendulum, corresponding to that of the station wanted, and opens and closes the switch *32* so as to throw current on the line during the second half period of vibration of the selected pendulum. The operator works the switch *32* by hand in calling, and watches her own pendulum in doing so. The pendulum at the selected station arrives at its full amplitude of vibration while the others do not, and it alone closes together the contacts *15-16* to ring bell *17*.

799,722—A. G. Iavis. Portable Support for Telephones.

This is a portable telephone outfit which may be readily attached to a fire alarm or other box, and its cord plugged into terminals so as to get on the line. *2*, *3*, *4* and *5* are the flaps of a leather carrying case, which normally fold up around the telephone and fasten together with a clasp not unlike in appearance to a lunch box. When opened out hooks, *13*, on one of the flaps serve to hang up the device.

799,760—C. E. Scribner. Service Meter Apparatus for Telephone Exchanges.

This is a register scheme for working the central office end of pay station and metered lines uniformly. The idea is that the subscriber presses a button *t* in calling, which button engages a latch m^2 on the armature of a registered magnet *m* at the substation, closing the sleeve side of line through said magnet to ground, and thereby completing a path for current through the line relay *c*, to light the lamp *c'*. This current is not sufficient to energize magnet *m*. After the operator has plugged in, however, she can energize the magnet in either of two ways, by means of special generators, either over the sleeve side of line, or over both sides. In the first case the register magnet will pull up far enough to release the push button, whereby it is cut off from the sleeve side of line, but not far enough to register. If current goes to both sides, the magnet will continue to pull up, by reason of contact with a spring *s*, to the tip side of line, whereby the register *l* will be set forward one number. The operator uses one key or the other according to whether she gets the line wanted or not. This general operation is the same as in patent 665,874, January 15, 1901, to Bullard, for a coin control system. Both patents belong to the Western Electric Company.

799,887—S. M. Grant, deceased. M. A. Breadbeft, executrix. Party Line Telephone System.

This patent is assigned to Sara O. Wilson, and all the parties are Indianapolis people. There are eighteen sheets of drawing, each presenting the same appearance as the one shown herewith, which represents two substations on a party line, with their necessary relay equipment, to give selective lockout service. Broadly stated, the scheme is to have two sets of relays, one responsive to direct current, and the other to alternating ringing current.

The selecting operator's apparatus being shown at the bottom of the figure, a brief statement of the operation is as follows: Supposing that a call is sent in for station *X*, the operator closes the switch *c*, closing a circuit through line wire *33*, including the relay *A* and the generator *200*, the return being through wires *41* and *37*. Relay *A* throws to the left and closes the circuit of relay *F*, also *N*, and to switch *a*. This switch being then closed sends current over line wire *34*, whereupon *F* throws to the right, and *N* closes *112*, *114* and *113*, *115*, which would close through *O* and *P* except that *F* breaks at *70*, *71*. The action of *F* closes through *G* and part of circuit of *B* and *C*. As soon as *G* is energized it throws to the right, and closes *B* and *C*. *B* swings to the right and *C* to the left, *B* breaking the circuit through *A* at *51*, *53*, and *F* at *50*, *52*, restoring the same to normal, and closes a locking circuit through itself and *C* through *54*, *55*, and *64*, *65*. The restoration of *F* closes through *O* and *P*, both of which throw simultaneously to the right, and the receiving circuits of both telephones are broken at *116*, *117*, and *122'*, *122*. *C* moving to the left closes through itself and also partly through *H* and J at *57*, *59*, and the swing of *B* to the right cuts off *A* at *51*, *53*, which causes a break at *48*, *49*, in the circuit of *F*. Thereupon the operator opens switch *a*, *N* is de-energized, *O* and *P* return to normal closing the receiver circuit, *G* is de-energized breaking through *C* at *79*, *81*, but *C* is locked up. *G* completes closing through *J* and *H* at *76*, *77*. Thereupon operator closes switch *a*. *N* closes *O* and *P*, which break the receiver circuits, *J* throws to the right closing *91*, *93*, through itself and *K* through *90*, *92*. *H* closes *84*, *86* and *D* through *85*, *87*, whereupon *I* lets go, breaking *C* at *64*, *65*, *C* restores, *I* locks, *C* breaks *J*. Successive movements of *J*, *K*, *C* and *O* permit the establishment of a receiver circuit at *116*, *117*, and a ringing circuit at *96*, *98*. The operator, by using switch *b*, may ring up *X*, *Y* remaining broken at terminals *106* and *108* of *M*. Switch *a* is opened, *H* returns to normal, and the parts are in position to permit conversation to *X*.

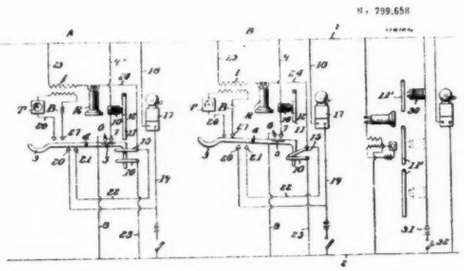
800,160—M. G. Kellogg. Multiple Switchboard for Telephone Exchanges.

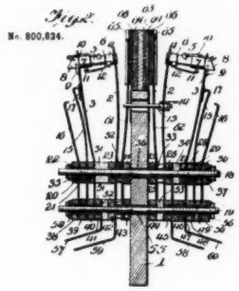
This patent is assigned to the Kellogg company, and is apparently one of the famous batch of Kellogg patents which came out in 1897, leaving a few lingerers in the office. All of these cases make difficult reading, especially as they relate to old practice prior to 1891. In the system shown, when two lines are connected together, each is grounded through a polarized line annunciator, and a neutral clearing-out annunciator is in a ground tap from the cord. The cord battery is so connected as not to work the polarized line signals, and is too weak to work the clearing-out signal, but either subscriber may send current of proper polarity to throw down the clearing-out bell without working the line signal. The subscriber's generator has a commutator and selecting keys.

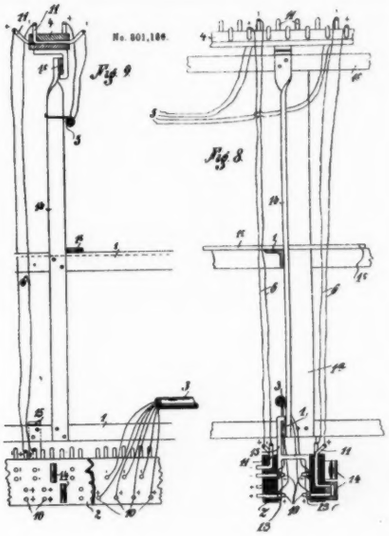
800,161—M. G. Kellogg. Switchboard for Multiple Exchanges.

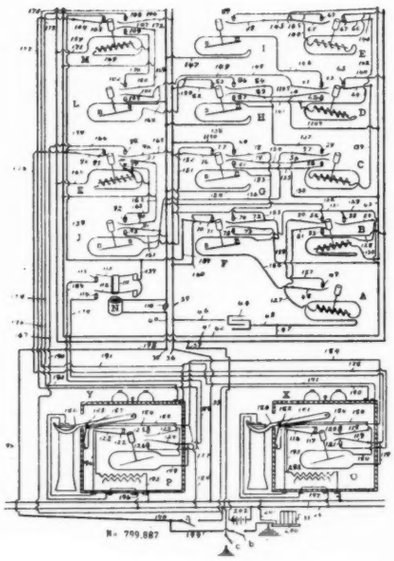
This is another of the same set, also assigned to the Kellogg company.

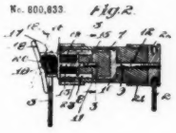
In the present case no special apparatus is used at the subscriber's station, but the clearing-out annunciator is low wound and the line signals are high wound, the line annunciators being permanently connected, and the clearing-out annunciator in series with the opposite side of the through circuit during connection. The subscriber grounds his generator in ringing off and the current flow through the line annunciators is insufficient to operate them.

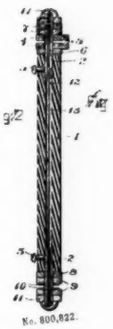


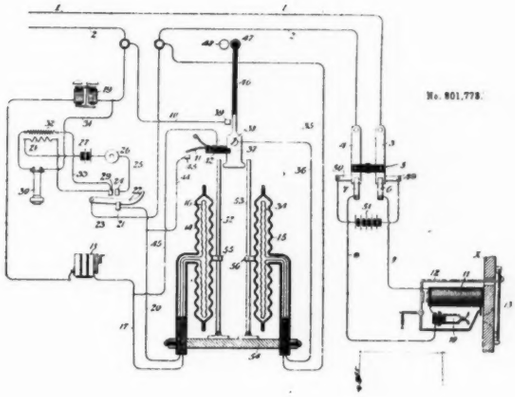


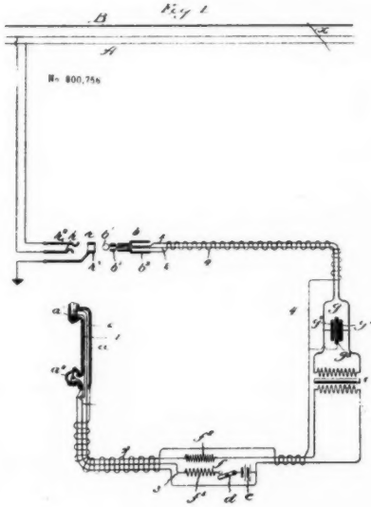


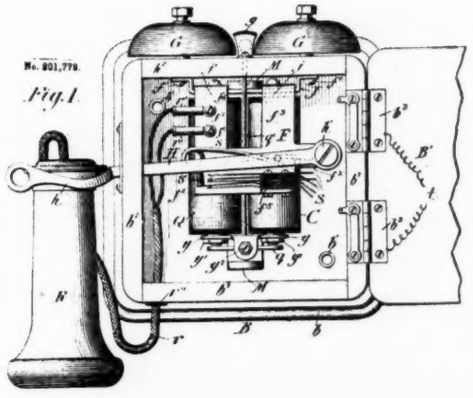


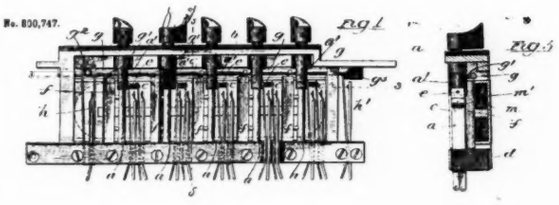












800,534—A. K. Andriano and H. Herbstritt. Secret Service System for Interconnecting Telephone Lines.

This patent is one of a series assigned to the Direct Line General Telephone Company, of San Francisco. The object is, in an intercommunicating system, to prevent a third party from listening in when two stations are talking, to do this without interfering with the rest of the system, and to provide a busy test. The talking circuit at a station is controlled through the ringing circuit, so that the bell must be rung to close it. When an attempt is made to get in on a busy line, the receiver is rendered inoperative by a sort of busy tone test, making a loud sound.

The figure is a diagram showing three stations. The usual selecting switch is provided, being set in station 1 to call station 3. The parts at the latter station are normal, while at station No. 2 the party is trying to listen in. By so doing, he has short-circuited his controlling magnet *14* so that it buzzes, making a loud sound in the receiver, which not only drowns out any conversation, but serves as a busy signal. This will be understood, if it is considered that, selecting a busy line, the caller cannot close the break *2-3*, while the lever *8* at *14* rapidly vibrates, because of current through wires *v32, 36*, and stops *29-31* to frame *9*, thence through lever *8* to stop *15*, and by wires *16* and *42* back to battery. The magnet *14* thus becomes a buzzer. The sound may be communicated to the receiver mechanically, but a local circuit is preferably provided.

When a switch has been properly set on an idle line contact, and the ringing key has been pressed, the receiver and transmitter will be in circuit when the former is taken down, which is not done at the calling station until after the switch has been set and the ringing key pressed, nor at the receiving station until after the bell signal has been received. The switch arm is fly-back, and the magnet *14* is a locking magnet for the purposes stated, working on the ringing battery *m*.

800,657—I. Kitsee. Telephonic Transmission.

The object of this invention is to increase the efficiency of the receiving by removing the impedance of the secondary of the induction coil from the path of the currents to the receiver. Each secondary is bridged in parallel with its receiver, having equal and opposite windings, both connected to one side of line at their ends, and to the opposite side of line from an intermediate point.

Dr. Kitsee says that with this arrangement there will be no shunting, but it is to be observed that this is questionable, and also that the arrangement of these pieces of apparatus in parallel is old.

800,675—H. G. Pape. Telephone Receiver.

This receiver has several novel features. The cap is slit radially for the sound to pass through, and a circuit closer, *30, 31, 32, 34*, is fitted to the back of the shell in such a position that it is presesd upon by the head band when the receiver is in use. The magnet is adjustable from the outside, and includes an outer shell, a core and an interposed coil, this giving a double adjustment, since the shell can be adjusted in the shell of the receiver, and the core carrying the coil can be adjusted inside the magnet shell.

800,676—H. G. Pape. Combined Telephone Receiver and Aural Massage Instrument.

This receiver includes some of the features of the preceding one, the magnet being constructed in the same way. There is an armature for the magnet, however, as shown at *25*, at the opposite end from the diaphragm *9*, this armature working an interrupter *22* when current of "high amperage" is used. The circuit is closed by the head band as before.

800,747—F. H. Loveridge. Key for Telephone Switchboards.

This is a selective party-line ringing key, with locking means to retain a key when set, and a circular motion, instead of the plunger motion, for each spindle. The views herewith are, respectively, a side elevation, and a transverse section. Each set of springs, *c*, is worked by a rotary spindle, *a*, provided at its upper end with a finger-crank, instead of the usual button. Along one side of all of the spindles extends the rectangular electromagnet, *m*, having a winding *m'* surrounding its central pole piece. Each spindle has an armature *f*, which, when the key is turned, will stick to the iron of the electromagnet, whose circuit is then closed. The last key used is thus kept turned, so that a glance will suffice to pick it out.

The patent is the property of the Western Electric Company.

800,756—F. R. McBerty. Protective Apparatus for Electrical Instruments.

It has become common to provide telephone lines along electric railways, and portable telephone instruments are furnished, to be carried on the cars, these instruments being provided with flexible cords and switch-conductors, by which they may be connected with the telephone line at certain points along the route where connection switch-terminals are located. It has been found that the users of such portable telephone instruments have been frequently subjected to severe shocks from high-tension circuits with which the telephone-circuits may be accidentally crossed. Such high-tension currents will frequently break down the insulation and pass to earth through the body of the user of the telephone, who may receive the discharge either from the frame of the instrument which he is holding or from the flexible conducting-cord. The ordinary insulation of the cord will not be sufficient to prevent the discharge of high-tension currents, and this discharge may take place either to the other conductors of the cord or across the insulating-covering to the user. The present invention is specially designed to offer protection to the user of such an instrument. The plan is to provide a switch for a portable telephone which will complete a direct ground connection for one of the conductors of the flexible conducting-cord leading to the metallic frame of the instrument, the switch being constructed to complete such ground connection before the other conductors are connected to the line. With this arrangement, if the telephone-line should be charged with high-tension current, such charge would not be transferred to the connecting-conductors of the portable instrument until the frame and one conductor of the cord had already been grounded. Any discharge would, therefore, take place to said grounded conductor, instead of through the body of the user. Preferably, the extra conductor, which is thus arranged to be grounded, to provide a direct path to earth, is wrapped around the other conductors, so that this grounded conductor is interposed between the user and the main circuit-conductors, which are liable to become charged to a dangerous potential.

The diagram is sufficiently plain without detailed description. *B* is the high-tension wire, *A* is the telephone-line, and *x* is the possible cross. The jack is supposed to be located in the pole-box, and the plug *b* to form the terminal of a portable set on a car.

This patent is the property of the Western Electric Company.

800,767—P. J. Spies and R. C. Deuben. Telephone Transmitter.

This patent is assigned to Spies & Klein, a Chicago firm. The invention is a solid back granular transmitter, having the usual front-plate, bridge and front electrode carried on the diaphragm, with the auxiliary diaphragm *R* clamped to

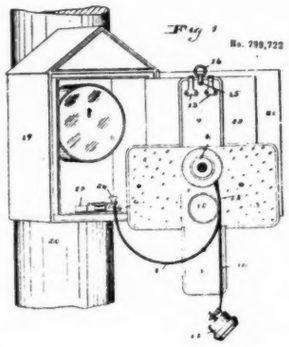


Fig 1
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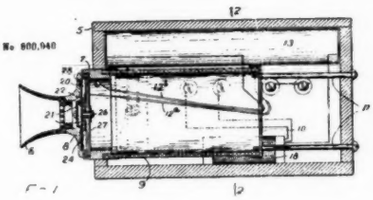
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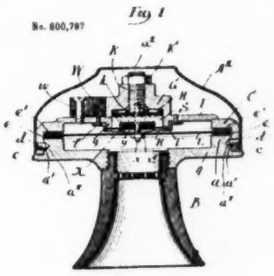
Fig 1
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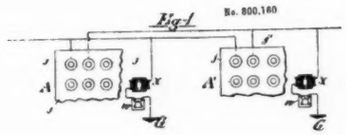
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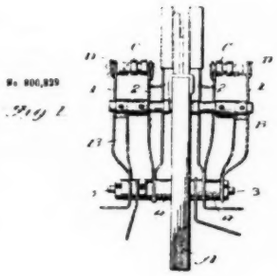
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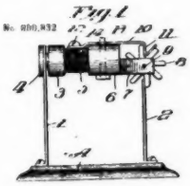
Fig 1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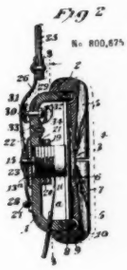
Fig 2
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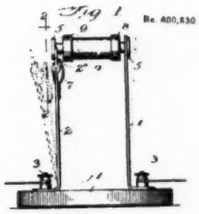
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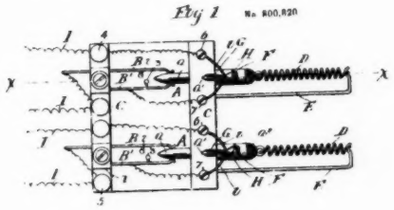
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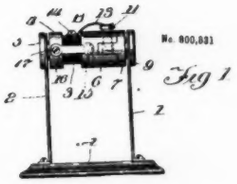
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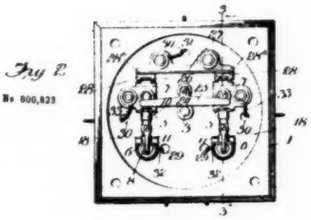
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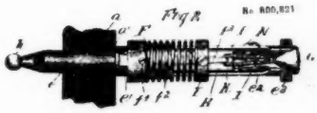
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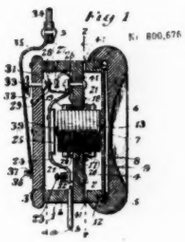
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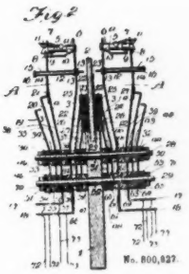
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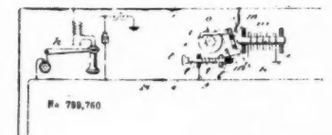
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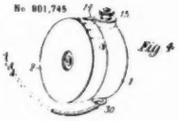

No. 801,745
Fig 4

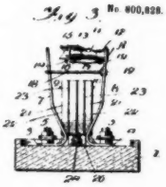


Fig 3
No. 800,828.

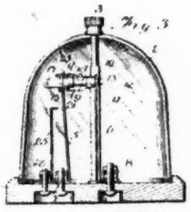


Fig 3
No. 800,826

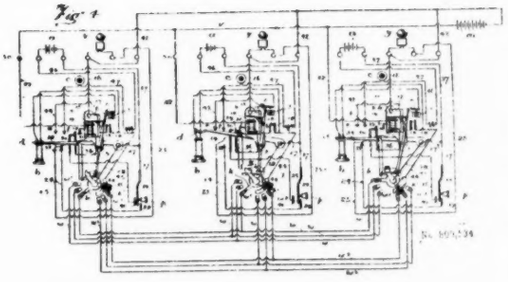
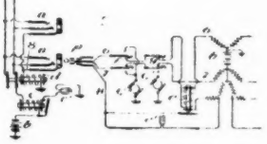


Fig 4



the edge of the containing cup *G*. Instead of having the main diaphragm carried on the front-plate, a ring *C* is provided, with which the bridge is made integral, the cup *G* is formed in the bridge, and all of the parts, including the main diaphragm, are assembled either on the bridge or on the ring attached thereto. This being so, there must, obviously, be an adjustment for diaphragm tension, and so the rear electrode is mounted on the screw-threaded stem, *K*, adjustable through the bottom of the cup.

800,820—C. A. Rolfe. Thermal Cut-Out Device.

This patent is one of fourteen, all issued together on Oct. 3, numbered from 800,820 to 800,833, inclusive, and all assigned before issued to the Rolfe Electric Company, of Rochester, New York. All these patents are interesting, for three reasons—first, because Mr. Rolfe has long been identified with protective devices in the telephone field; second, because several novel and interesting features appear; and third, because of the care with which the patent specifications have been prepared, this being rendered necessary by the state of the art, as well as by the prospects of sharp competition.

The present patent, the first of the series, relates to means for automatically breaking any low-tension circuit on the occurrence of a cross with the high-tension circuit. The application was filed in January, 1897, and, as may be imagined, the device is not of the form at present in use. It includes a plug normally stuck into a jack and bridging across a pair of springs included in the circuit. A strong spring *D* tends to pull out the plug, but is prevented from doing so by a button *F* made of wax and containing a heat coil connected in the circuit. When the wax melts, the plug pulls out. The plug is a feature of the claims.

Taking the next patent, 820,821, of the same series, we find this covers an improvement by which the necessity for any separate support for the ejecting spring is done away with, and the plug structure is made an independent unit. On the plug itself is a fixed stop or a button *L*, against which the spring *f2* rests at one end. The other end of the spring tends to shoot forward a ring *F*, which is normally held back on the plug, against the tension of the spring, by the wax button *G* containing the heat coil. The circuit in this case passes through the plug, which is shown as of the same type as the ordinary switchboard plug. Of course, the entire structure may have an outer casing or handle. Any excess current will melt the wax, release the spring, and permit the plunger ring *F* to be thrown against the face of the switchboard so as to kick out the plug, thereby breaking the circuit.

The next in the series is 800,822, which covers an improvement in fuses. Both the preceding applications were filed in January, 1897, but the present one was put into the Patent Office in January, 1902.

The tube *1* is conveniently made of wood coated with waterproof paint. The fuse wire, *12*, which is, of course, very fine wire, is wound upon the supporting wire *13*, which is threaded through the bore of the tube, and the ends of the fuse soldered to the threaded sleeves *2-2*. Suitable terminal caps *11* are then applied, clamping nuts or rings being also provided, as shown. When a fuse is blown, the caps are removed, the wire *13* is taken out, and a new fuse put in.

The next in the series is 800,823, which covers a protective set for subscribers' stations, mounted on a porcelain base, with a bell glass cover. The two sides of line come in and have the usual spark gap provision for high potentials, and two heat cartridges, each comprising a little cylinder of ebonite or rubber, with caps to take onto the springs, one of the caps carrying a bell-crank lever now familiar as a distinguishing feature of one type of self-soldering heat cartridge. A stick of high resistance graphite is used instead of a coil, and this substitution is claimed. A pivoted cross-bar *25* is carried on a post so that normally it cannot touch both line springs at once, but if either heat coil lets go so the spring will come back against its end of the lever or cross-arm, the same will be turned so as to short-circuit the line.

The specific heat-concentrating device, as well as the broader features of the general invention, are stated to be claimed elsewhere, the present patent being intended to be specific. The application was filed February 13, 1903.

The next case in order is 800,824, the gist of the invention covered being the means for short-circuiting the line springs upon the operation of a heat coil. The figure herewith shows a section taken through a familiar form of strip or plate *1*, carrying banks of line and switchboard springs. One spring *2* of each set carries a stud *13* which projects through an opening in the plate *1*, so that when either heat cartridge *5* operates, the stud will short-circuit the line through the springs. Self-soldering heat cartridges are employed, and claimed in combination.

The next is 800,825, for which, as well as the preceding one, the application was filed February 13, 1903. This covers another fuse, having a wooden tube *1*, coated on the outside with waterproof paint, and provided at each end with a threaded brass sleeve held in by a pin *4*, which is first put entirely through the sleeve and tube, and then has the middle portion cut by putting a drill through the tube. Connection terminals are nuts *7-8* screwed on the sleeves over pairs of washers, one fluted and one plain in each pair. The fuse is threaded through the tube and soldered to the ends of the sleeves.

The next is 800,826, covering another form of subscribers' protective set, with an automatic shunt for the line when either or both of the heat cartridges let go. Graphite cartridges are used, of the self-soldering type, and a pair of upstanding fixed posts behind the line springs are connected to ground. If either cartridge lets go, its side of line is grounded, and if both let go, the line is short-circuited and grounded. A feature of the invention is the provision of the stop or abutment which prevents the opening of the line.

The next patent is 800,827, granted on an application filed May 18, 1903, and covering contacts arranged in banks, having but a single heat cartridge per line, and means to short-circuit the line when a cartridge lets go. The devices are connected in shunt, the terminals *17* and *18* going to both the jumper or cross-connecting wires *72-72*, and to the cable wires *73-73*. The left-hand lightning-arrester contact *26* is connected with the left-hand spring *3* by means of the metal disks *46* and *66*, and the spring *4* is connected with the right-hand lightning-arrester contact *27* by the metal disk *45*, the rod *28*, and the metal disk *47*. In a similar way, the right-hand springs *3* and *4* are connected, respectively, with a right-hand contact *26* and the left-hand contact *27*. The two protectors shown in the figure are for two different circuits, and when either of them lets go, its stud *12* comes against the post *2* connected to the grounded plate 1. Each heat cartridge, being bridged across its line, takes current in proportion to its resistance, and upon an excess of current passing, acts to short-circuit its line, and then resolders itself.

The next patent is 800,828, which covers a protective set having a self-soldering cartridge, and a connection attached to one of the line springs, and extending around and in the rear of the other so as to form a low-resistance connection between two springs on the release thereof by the operation of the cartridge. This connection is a metal rod or bar *18* carried by one spring and bent around back of the other so as to hook against it when the springs spread.

The next patent is 800,829, granted on an application filed September 25, 1903. It presents a self-soldering heat cartridge, of the star-wheel variety, together with what an electric light man would call an adapter, to permit the cartridge to be used with old-style line springs. The figure shows a plan view of the usual iron strip *A* carrying the lightning arresters and the banks of springs. In these springs, a

cartridge was intended to be used having two button heads, fitting in slots in the ends of the springs. In order to use a cartridge with only one button head and a star wheel, a bent piece of metal is provided which has a slot for the star wheel to catch into, and a head to take into the springs. Its function is similar to that of the electric light adapters so familiar a few years ago, when lamps of one make could not be screwed into sockets of another.

The next patent is 800,830, which presents a self-soldering arrangement in which the soldered part is on the springs, and not on the heat cartridge at all. The heat cartridge is a plain button-head affair, carrying a coil and taking current from one head to the other. The heat is communicated to the spring *2* through the head *5*, and the spring *2* has its upper end jointed or fitted with a star, being normally rigid through the use of solder. Upon undue heating, the solder softens, the joint yields, the springs pull apart, and then the restoring spring *7* straightens the joint again, so that it will resolder, upon cooling, in operative position.

The next patent is 800,831, granted on an application filed December 29, 1903. The invention is an improvement in the heat cartridge itself. This comprises a block *3* of rubber or ebonite, a terminal *4* having a head *5*, and a coupling device consisting of members *6* and *7*. The member *6* is secured to the insulating block *3*, and has a slot or recess in which fits a tongue *10* on the member *7*. This tongue has an opening through it, which, when the parts are assembled, registers with a slot in the member *6*, and receives a pin *11* pushed down by a spring *13*. The pin *11* is soldered by soft solder, and a graphite pencil is used to generate heat, extending through the member *6* at *15*. After operation, the tongue on member *7* is hooked in behind the pin *11* from the side, the pin having been forced down by spring *13* to resolder.

The next patent is 800,832, the application for which was filed on the same date as the preceding one. The invention is a self-soldering heat cartridge in which, instead of having the terminal member, such as the hook or star wheel, soldered, a pawl or detent is provided which is soldered and which resoldered itself upon cooling. Thus, in the figure, the star wheel *8* is held from rotation by the pawl spring *10*, the latter being soldered at *14*. The heat coil is inside the cap *6*, and upon excessive heating, the pawl *10* yields, the star wheel *8* turns, the spring *2* is released, and the spring *10* comes against the next tooth of the wheel *8*, and resolders itself. There are nineteen claims on this device.

The last patent of the series is 800,833, the application for which was filed July 28, 1904, and which covers a well-known form of cartridge. This cartridge has a double trigger at one end, soldered between metal ears. In the figure it is shown holding the springs *2* and *3*, and the trigger in dotted line position after operation. It resolders in this position, and is then reversed by hand in the springs. There are eleven claims in this patent.

800,855—I. Kitsee. Telephony.

Dr. Kitsee states in his specifications that "In long-distance transmission the self-inductance capacity and resistance of the line greatly retard the transmission of speech." It seems, in order to overcome these various deterrent characteristics, the Doctor has employed inductoriums having very high wound secondaries, some of them, in fact, having over ten thousand turns of No. 40 wire. He says that in over a single wire line 250 miles long he was able in this way to drown out all induced currents, but, unfortunately the high resistance of the inductoriums kills the speech at each incoming end, as well. If at one of the stations the secondary was shunted in receiving, the effect was good, but breaking the shunt killed the speech. A change in arrangement was therefore necessary, which he says resulted in the present invention. Herein he puts the transmitter in a local circuit with the primary, its secondary being to line in parallel with the receiver. Included in the receiver branch is an artificial line, consisting of capacities, ohmic resistance, and self-induction coils, adjusted so as to produce the equivalent of the real line. Dr. Kitsee says that the transmitter secondary will then send currents to line which will divide about equally between the home station and the distance station. This does not seem possible, for, assuming that each end has an artificial line, he has evidently overlooked the added or doubled resistance inductance and capacity at the distant end.

800,907—W. B. Curtis. Antiseptic Telephone Mouthpiece.

This is a rubber mouthpiece of ordinary form, having the usual perforated partition in it, and a hollow ring-holder around it outside the partition, filled with absorbent material soaked with sterilizing material. The mouthpiece is perforated all around front and back of the partition, to let out the fumes of the antiseptic.

800,940—J. Prince. Telephone Transmitter.

This patent is assigned to the Prince Telephone Company of the District of Columbia. Two alleged novel features are presented, one a cylindrical glass resonator about the size of a dry battery, to one end of which the transmitter front-plate and diaphragm are connected; and the other, the use of magnetic iron particles mingled with carbon in the resistance chamber, the front and back electrodes *21* being thin magnetized disks. Greater efficiency is claimed by the use of the resonator.

801,034—W. J. Murdock. Telephone Receiver.

This invention relates to the cap of a receiver, particularly, as the part most liable to injury. A metal reinforcing ring is moulded around the cap when the latter is made, lessening the tendency to cracking or fractures.

801,130—J. C. Barclay. Telegraph and Telephone Line, and the Like.

This is a scheme for overcoming induction and static disturbances in cable lines and lines composed partly of cable and partly of open wires. To remedy the inductive interference between different circuits, Mr. Barclay says he selects certain of the conductors of the cable as anti-induction conductors and grounds them at short intervals, say, of half a mile, thereby producing circuits of relatively low resistance, which absorb substantially all of the inductive effect of the remaining or working conductors. He says this has the effect of overcoming inductive interference between the different circuits, but increases greatly the capacity of the working circuits, thus increasing the retardation in said circuits and the other troubles he mentions. To overcome these difficulties, he provides the working conductors at intervals, with ground connections, or leaks, or high resistance, at intervals of, say, half a mile, which serve to dissipate the static charge of the line with small loss of current.

801,132—M. Barr. Electrical Means for Detecting and Announcing Contact Between Two Conducting Bodies.

This patent, which is a rather singular one, is assigned to the Linotype Company, Limited, of London. It presents nothing in the world but this: In some machine tools, such, for instance, as are used in engraving, it is exceedingly important to know the exact instant that the tool point touches the work, but the delicacy of the tools and the work prohibits the use of current enough to work an annunciator, which might spark and damage the contact points. As the present invention is meant to be applied to machines involving an exactness in dimension up to a ten-thousandth of an inch, ordinary current is out of the question. A telephone receiver is therefore used, the current that will work this being too weak to spark, and enabling the operator to

tell the difference between a spurious contact and a real one, the latter giving a sharp sound, and the other, as of clinging filings, giving a rustling sound.

801,186—G. Deisenhofer. Main Distributor for Telephone Exchanges.

This is a distributing rack designed in Munich, Bavaria, Germany, and assigned to the firm of Deutsche Telephonwerke R. Stock & Company, G. M. B. H., of Berlin. The two terminal members of a pair are arranged close together and placed so that the broad faces thereof turn to each other. The terminal members situated vertically to the front face of the frame are so utilized upon three sides that the jumper wires are connected on the rear small side, while the line wires are connected to the terminal posts extending from the inner broad side. The terminal posts stand out with their free ends on the outer broad side, where they are connected by fuses. These posts are made of round wire, the projections or line pins serving for testing, among other things. Some terminals are made straight and others bent, for a reason which is not clearly apparent.

The frame comprises L-shaped bars on the floor, to which vertical angle irons are fastened. Horizontally connecting these irons are flat bars *1b*, extending from front to rear. Other bars *1c* extend from one side to the other of the frame, and on their rear ends these carry the horizontal terminal members *4*.

In front of the vertical bars *1* vertical terminal members are arranged in parallel pairs and supported by iron carriers *15*. These members, carrying the posts *10* and *11*, are arranged with their broad faces opposite each other and but slightly spaced apart, but with the usual distance between the sets of pairs. Just enough distance is left between the members of a pair to insert the fingers, while between each pair of strips, or terminal members, there is room enough for the arm to be inserted.

801,231—F. E. Farmer. Index Attachment for Telephones.

A simple bracket formed out of sheet metal has two widespread arms and two narrower arms. The latter are clamped in the knuckle joint of a desk set transmitter, while the former have journaled between them a drum bearing names and numbers, and provided with a thumbnut for turning it. This brings the index or drum just behind and above the transmitter head.

801,308—J. Erickson. Lock for Automatic Telephone Switch Shafts.

This is a special lock, applied particularly to hold a first selector switch which has been set around for a fire alarm or police call. In the Strowger system each line has a first selector switch, and each switch has a vertical spindle having circular ratchet teeth cut around it and a broad-faced rotary ratchet extending up and down it. The spindle is first stepped up to the desired row of contacts, and then rotated, and in the present case a special pawl is fastened on the frame which will engage and hold the rotary ratchet after a certain amount of rotation, or will hold the spindle up after it has been raised to a certain row. These are nothing but mechanical detents, properly spaced, and requiring to be released by hand, since there is no magnet for releasing. This patent is assigned to the Automatic Electric Company of Chicago.

801,745—E. W. Schneider. Massage Apparatus for Improving the Hearing.

This patent is assigned to the Mears Earphone Company of New York. The receiver has a micrometer adjustment, and a make and break contact operated by a pivoted lever resting against the diaphragm. The entire outfit includes a carrying case with dry cells and a plug and jack for connecting the receiver. The purpose of the outfit is to massage the ears mechanically. When current is started through the receiver magnet, the latter moves the diaphragm rapidly and alternately to and fro, making and breaking its own circuit, and producing divers explosions which are supposed to be beneficial.

801,778—Charles E. Egan. Telephone System.

All of Mr. Egan's patents have been assigned to the Egan Electric and Telephone Manufacturing Company of Petersburg, Illinois, a new corporation which is building an extensive plant to put the apparatus on the market, having enlisted heavy Illinois capitalists in the enterprise.

The present invention relates to party-line system and to a simple form of relay for cutting out or shunting idle stations and apparatus. A switch *3-4* at the central station serves to put on current from battery *51* when desired. At each substation a pivoted switch lever *37* is controlled by two expansion diaphragms, forming the walls of air chambers containing resistance wires *16* and *34*. When battery current is thrown on the wire in circuit gets hot, the expansion of air forces out the front diaphragm, and the switch is thrown over. The other diaphragm is worked to throw it back, a tolerably efficient form of thermal relay being thus produced.

801,779 and 801,780—C. E. Egan. Telephone System and Apparatus.

These two patents relate to the same system and apparatus, so they may be referred to together. In this design, Mr. Egan has aimed to produce a compact common battery subscriber's instrument. The entire structure is really carried on the ringer frame. The yoke of the latter carries a pair of fingers, which drop down in front and are connected by a plate upon which the switch springs are mounted The plate and fingers are preferably punched and formed out of one piece of metal, with an extension on one side to take the hook lever pivot screw, and binding posts mounted on the other side for the cord terminals. The ringer cores are made very long, and the condenser is rolled on one of them, while the other carries the ordinary winding. The condenser and winding are in series in ringing, but in talking the coil is switched into the transmitter circuit, where a portion of its winding serves as a choke coil, while the condenser is switched into the receiver circuit. The containing case may be either wood or drawn steel, and in the latter case it will take up no more room than a metal desk set ringer box.

GRAND RAPIDS AUTOMATIC SMOKER.

On October 11th the male employes of the Citizens' Telephone Company of Grand Rapids, Michigan, held a social session and smoker. This entertainment was given by the "Automatic Circle."

Last winter the inspectors, trouble men, and switch men in the employ of the company organized a club for the purpose of social and educational advancement. The club met about twice a month and a committee notified different members that they would have to prepare papers on subjects connected with telephony for the different meetings. The men entered into this with a great deal of enthusiasm and the benefits derived from preparing and reading these papers, and particularly from the discussions that followed same, have been very great. The social features of the meetings have been incidental.

The meetings were discontinued during the summer months, and for the purpose of starting the meetings for this fall in good shape it was decided to have the first meeting a social one, and this resulted in what was called the Automatic Circle Smoker, given on the night of October 11th. About ninety-five per cent of the male employes,

amounting to one hundred and three, attended the session and it was a rousing success in every way. The fun started at 8:00 p. m., and continued with no let-up whatever until midnight. Music, speeches, stories and a little black-faced minstrelsy made up the program. Everyone took part, from the general manager to office boy.

These meetings are of great value both to the employe and the company, and it would be well if other companies helped their employes form an association of this kind, for any help that the officers of a telephone company can give towards creating interest and bringing employes closer together will increase the efficiency of the whole force.

The program carried out at the smoker follows:

PROGRAM.

Chairman, F. V. New(wo)man. Doorkeeper, George Higgins.

Note.—No one will be admitted unless he is attired in at least a shirt, shoes and stockings, and a safety belt.

Address of Welcome, C. E. Tarte; Passage of the Pipes, with tobacco accompaniment, E. Land and trained assistants; Smoke up Everybody (Pearse is to blame for the tobacco); Song, "Sweet Marie" (Wagginer), A. Davids, or "From Kalamazoo"; Speech, "Why I Became a Man," W. Davis, or "The Man Behind the Brace"; Song, "The Little Red Caboose," George Higgins, or "Rain in the Face"; Piano Solo, March, "Keyboard," F. Kooyers, or "The Flying Dutchman"; Recitation, "Why Is a Hen, or When I Was in Love," Mack Lewicke, or "Silent Tim"; Everybody Stretch, Everybody; Male Quartette, Fletcher, Anderson, Crowl, Shattuck, or "The Babes in the Woods"; Instrumental Trio, a few short contacts, Fausey "Smiler," Chappell "The Monk," Engbloom "Shamrock," Story-Prevarications, J. Mooney or "Old Sobersides"; "A Hand Out" (Chopped Dog, Tarts-Spicey, Custard Pie-man), G. F. Stratmeyer, and corps(e) of dead men; Anvil Chorus, "Hit Her Up," W. Westerhouse, "The Village Smith"; Comedian (unknown), A. Mercer, "King Jollity"; Comic Story, H. Ide (Percy), "Just From Indiana"; Song (Sentimental), "Oh! Fudge," (a) "Hot Time in the Old Town To-night," (b) "We Won't Go Home Till Morning," G. C. Brittain, or "The Dago Count"; Song, "Little Willie Green," Brick Johnston, or "The Brigand"; Original Story (Brother of the above), Unknown, but welcome; Song, "Foolishness," Mr. Knapp, first cousin of Mr. Sapp; Jokes, "I Guess Nit!" Frank Fisher, from the beautiful city of Muskegon; Song, "Get Red-dy," Kutts, or "The Man Who Broke the Bank at Monte Carlo"; Story, "Middleville's Pride," D. Wallington, "Bicycle Conductor"; Speech, "The Endless Chain," Linkfield, or "Never Sweat"; Quartette "More Noise" (This number must get encored "In chord"), F. Lucia, he of the fair locks; Heaphy, his mother's pride; Morrey, too tough for Grand Rapids; A. Phillips, unknown, but trusted.

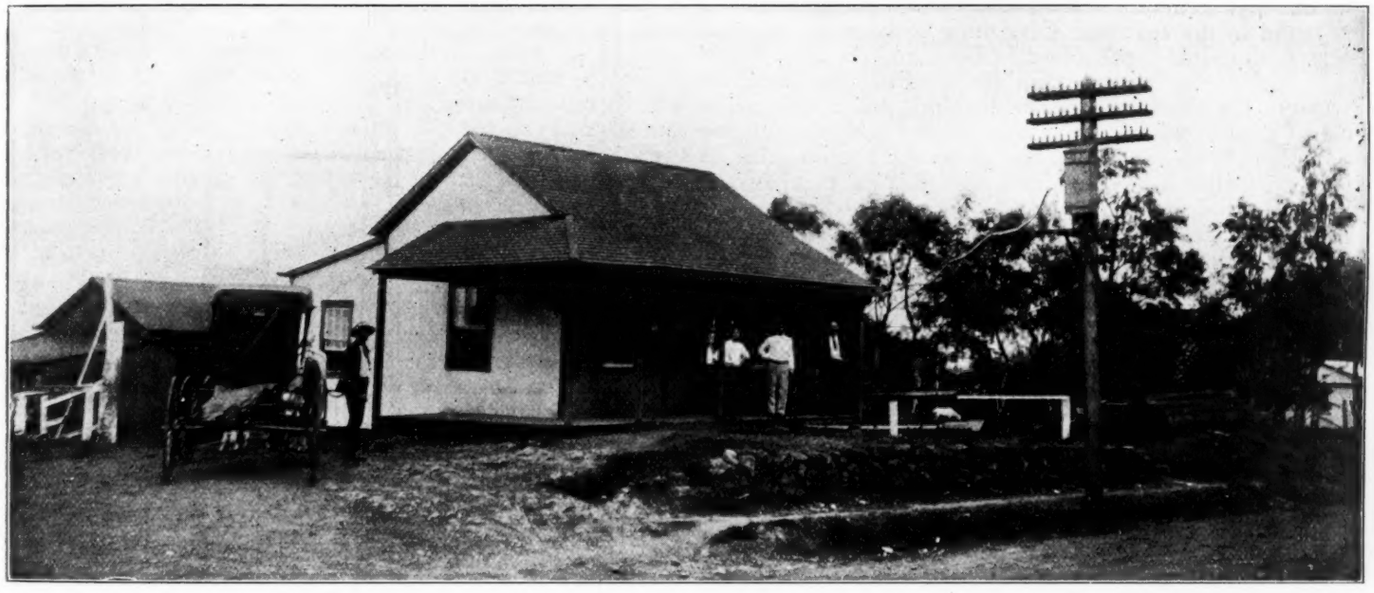
All those not especially mentioned on the program, if they get their back up can get their money back at the box office in passing out.

A HAWAIIAN TELEPHONE SYSTEM.

JOSEPH PRITCHARD.

Being engaged in the telephone business in the Hawaiian Islands for more than fifteen years, and keeping in touch with the advancement of the art and all the latest improvements and up-to-date construction methods, has enabled me to furnish a modern service to my subscribers, notwithstanding the fact that the cost of high-grade construction material costs so much when laid down in some of our outpoints of civilization. While our apparatus is good and our material and construction is serviceable, it is not as modern and efficient as that described in issues of TELEPHONY, where the equipment and workmanship is as fine as brains and money can produce.

In the islands we have four telephone companies, with something over six hundred subscribers, each subscriber being entitled to the use of all four systems. The rental received for service is six dollars per month. In so small a system $72 per year may seem a high rental rate with so comparatively small a list of subscribers, but we are compelled to make this charge for the reason that our material costs so much. In the illustration showing the office of our company, the pole in the foreground cost $7.50 before any work was done on it, and this price was paid for all the poles used in the island systems. Our company has ninety-five subscribers and covers a territory of fifty miles. We have paid dividends every year since service was opened. Our officers are: Wm. Horner, president; L. S. Aungst, vice-president; J. Pritchard, secretary and manager; A B. Lindsay, auditor; with C. B. Greenfield, M. V. Holmes and K. S. Gjerdrum as directors. We have no storms to contend with here as in the States, and while we have our rainy seasons there are no electrical storms of any consequence. The islands are connected by wireless telegraphy, and the service is very good. The minimum charge is one dollar for ten words and ten cents for each additional word. The telephone companies act as the agents of the wireless company at a fixed rate agreed upon, and send the messages to all points of the island over telephone.



BUILDING OF THE HAMAKUA AND SOUTH KOHALA TELEPHONE AND TELEGRAPH COMPANY, HONOKAA, HAWAII.

The Independent Telephone Company of Topeka, Kansas, recently issued a directory supplement which showed a growth of 800 subscribers in ninety days. The company now has over 4,000 telephones in service in Topeka.

Telephone Construction Practice

H. J. MINHINNICK

CHAPTER VII.

POLES AND POLE FITTINGS (CONCLUDED).

THE next process is the attachment of the steps, the wooden ones being generally put on first. A good, handy groundman with a light wagon should put on from 1,000 to 1,200 of these per day and, as already stated, they should extend about ten feet up the pole. No special mention is necessary save that the steps should be regularly spaced and so located that they will not be knocked off by passing wagons. The iron steps are, of course, driven by linemen, and a convenient crew will consist of three men with a light wagon and driver. Each man will drive about 300 steps per day and as the holes are already bored no difficulty will be found in the spacing. Care must be taken to drive all steps to the same depth (four inches), and the men should be careful to use no more than are required; the usual rule is to put the top step between the third and fourth gains, but on a cable pole which is always fitted with the full five arms there is no use in stepping above the bottom gain. A little calculation will show how easy it is to waste two or three thousand steps on a plant having, say, 2,000 poles, and a further computation will show that these 3,000 steps, together with the labor of driving them, cost at least $100—an item worth saving. For driving the steps most linemen use a hand-axe, but the writer has found that the work is made considerably easier by the use of a four-pound hammer of the pattern known to the trade as a "blacksmith's hand hammer," which resembles a miniature sledge with a short handle, and that the men will almost always prefer is to the hand-axe after a few days' trial.

The pole being now framed, set and stepped, the next process is the attachment of the arms, although as a matter of practice it is usual to defer the arming till the lines are guyed. However, as the setting of guys will demand an entire chapter, the question of cross-arming will be discussed in this one, but before going into it it may not be out of place to mention some special forms of pole which are occasionally required.

Prominent among these is the structural steel pole, which is being extensively advertised and which is deserving of consideration, especially on all-cable plants, for which it is better adapted than for plants built along the common lines of part cable and part open wires. This difference will be fully discussed in a later chapter on cables. This pole may be had in all lengths from 20 to 80 feet at prices about double what a wooden pole would cost for the sizes above 40 feet; below that length the relative price of the steel pole increases very rapidly. It is not the writer' opinion that this or any other steel pole will come into general use (except, possibly, as stated before, on all-cable plants), for the following reasons, while cedar can be had at reasonable prices:

(1) Excessive prime cost.
(2) Cost of setting, these poles requiring to be set solid in concrete.
(3) Danger, in fact, impossibility of raising them through high tension circuits.
(4) Difficulties in insulating them from adjacent circuits.
(5) Large butt space occupied by the larger sizes.
(6) Cost of maintenance, these poles requiring frequent painting to preserve them from rusting.

Another form of steel pole seen sometimes on very light work is the one formed from different sizes of pipe gradually tapering to the top, as illustrated in Fig. 1. This form is practically confined to very short poles, and is chiefly used for span wires for trolley purposes, it being poorly adapted to line use and capable of carrying but one or two arms. Still another pole is formed of channel iron, latticed together as shown in Fig. 2. This makes a neat and substantial job in such poles, as it is required—for instance, along a business street where wooden poles would be objectionable.

In the consideration of these forms one point must never be lost sight of, and that is that a steel pole is in no sense

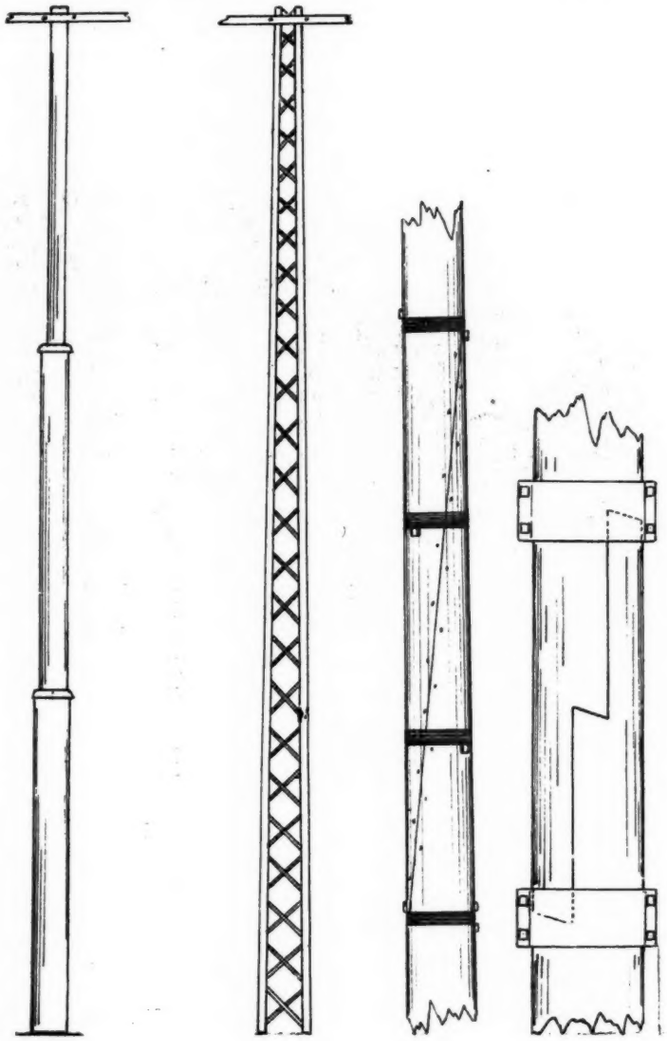


FIG. 1. FIG. 2. FIG. 3. FIG. 4.

a self-supporting pole—in other words, it must be guyed exactly as if made of wood. Of course, it may be made self-supporting exactly as a wooden pole may be and, as occasions may arise where guying is an absolute impossibility. These poles or stubs should, however, never be used except in case of absolute necessity, and it is rare, indeed, that some way out which will avoid them cannot be found. In an experience covering the setting of many thousands of poles the writer has not had occasion to use half a dozen self-supporting poles or stubs and would very gladly have

avoided even these. However, as stated before, there are occasions where they must be used, and when such a contingency arises the greatest care must be exercised in setting. In the first place the iron work must fit the pole closely at every point and be so thoroughly secured that it cannot move under any strain the pole will stand. It will be noticed that the poles illustrated require practically no bolts through or into the wood, and herein lies the greatest beauty of their design, for every bolt hole must of necessity weaken the pole seriously. In the next place the mortise into the bottom timber must be carefully made and be a close fit and the timber must be of adequate size—at least 12x12 inches. Lastly, the excavation must be made of ample width and depth and the concrete must not be spared. It is the writer's practice to dig the trench nine feet deep, two feet six inches wide and one foot longer than the bottom timber; a layer of concrete one foot thick is thoroughly tamped in and the pole set on this; the trench is then filled with concrete to within two feet of the surface and the balance filled up with earth. This makes a somewhat expensive job, but anything less will surely fail, and if it be worth while to set a pole of this kind it is surely worth setting in a way that will give it a chance to properly answer its purpose. It is hardly necessary to add that the straightest and heavest pole available should be used in such a case and that the top should be raked over at least three feet. When the pole is set and the trench filled not less than a week must be allowed for the concrete to set and before putting any strain on the pole the turn buckles must be screwed up as tight as possible, so, tight, in fact, that the pole will show a decided disposition to buckle under the strain.

At this stage of telephone practice the writer is almost ashamed to mention a spliced pole, as there is no greater or more dangerous abomination under the sun. However, it may happen, especially in smaller exchanges, that a pole of this sort has to be used, owing to the great expense which would attend the purchase of one or two poles too long to go on a single car, *i. e.*, over 40 feet. In such a case the only joint to be considered is what carpenters call a "scarf splice," which is made as shown in the Figs. 3 and 4. The heaviest available pole is used for the bottom section and the butt of the upper part is carefully shaved to the same diameter as the top of the lower. The scarf must be at least three feet long, and after being sawed out the surfaces should be dressed with a plane and brought to an exact fit, no pains being spared to effect this result. When the joint is so made that the adjacent faces fit closely each piece should receive a thick coat of white lead, and while this is still wet two five-inch collars should be bolted around the splice, as shown, close to the ends. The intervening space may then be served with No. 6 galvanized wire, drawn so tightly that it "grooves down" into the wood when the operation is completed, and one will have done all that is possible to make the best of a bad job.

While the poles are being framed and set the cross-arms will be prepared at the warehouse by being pinned and braced ready for attaching to the poles. When unloaded from the car and inspected the arms should be carefully piled (preferably in the open air) with strips between each tier, so there may be a complete circulation of air through the pile.

For the convenience of the workmen engaged in pinning, horses should be made three feet high and as long as desired. An arm may be used for the top piece and the legs formed from broken or cull arms bolted on and well braced. The accompanying drawing (Fig. 5) shows the detail of such a horse, which, being 102 inches long, will easily accommodate twenty-five arms. For driving the pins, mallets faced with fiber are much to be preferred to the ordinary hand-axe or hammer, as they will not split or batter the pin. This point was strongly impressed on the writer from his experience on two plants, each requiring some 30,000 pins. On the first plant the pins were driven with hammers and over 2,000 were spoiled by careless driving; on the second mallets were used and less than 100 pins were destroyed. The pins should fit the holes in the arm closely and must be driven home so that the shoulder above the tenon will come down on the top of the arm. If the pins fit too closely there is danger of splitting the arm, and if they be too loose it is impossible to secure them properly. In cases of this sort the question always arises whether the pin is too large or the hole too small, and to avoid disputes it is well to purchase both arms and pins from the same manufac-

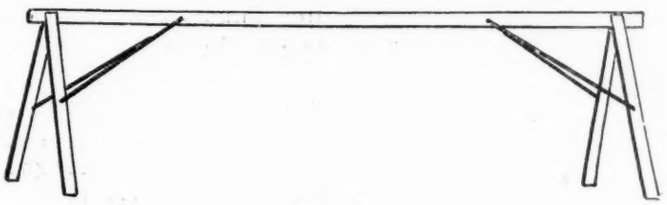
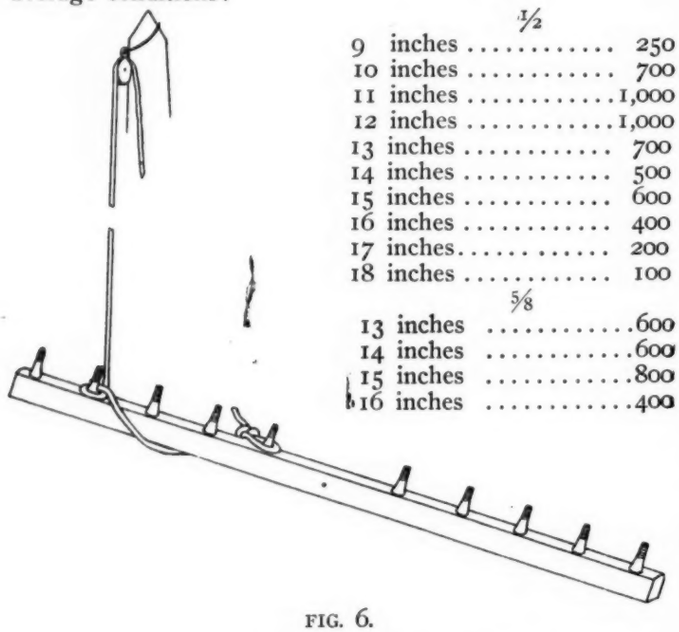


FIG. 5.

turer, and then, in case of trouble, he may choose which horn of the dilemma he pleases. When the pins are driven into the arms they are secured in place by a 5d nail driven through the side of the arm into the pin, and the workman must be instructed to take great pains in this particular and see that every pin is thoroughly nailed in. The tenon of the standard pin is about one-half inch too long for the telephone arm and the projecting portion must be sawed off in order that the arm may present a neat appearance. The writer has found it a decided economy to send all pins to the nearest wood-working shop and have them shortened half an inch before using them. The braces are then bolted on (a key wrench being decidedly handier than any other for turning up the nuts) and folded against the arm, which is again piled ready to go out. A good, handy man should find no difficulty in completely fitting 100 arms per day if the pins are of the correct length.

The warehouseman should be furnished with a list of the approximate number of double arms which will be required, and these he will prepare as follows: The arms being pinned and braced, as already described, he selects two of exactly the same length and placing them one on top of the other drives a ⅝-inch bolt through the center holes. Then with a 9-16-inch bit he bores four holes through both arms for the ½-inch spacing bolts—two between the outside pins and two between the pole pins and their neighbors; in other words, if the pins are numbered from 1 to 10 the first hole will be between 1 and 2, the second between 4 and 5, the third between 6 and 7 and the fourth between 9 and 10. The two arms thus prepared are wired together at both ends, so that they will not become separated, and are ready for use. While on the subject of double arms it may be well to mention the several spacing devices commonly used. The oldest of these consisted of a piece of pine timber 4x4 inches, which was cut to the correct length and bored at the pole where the work was to be done. It will readily be seen that this was a slow, clumsy and most expensive process, as must be any which compels the men to manufacture their own material. Then came the spacing bolt which is in very extended use at the present time and is very efficient, making a neat and workmanlike job, but which is rapidly being superseded by the far more economical and equally efficient round hardwood rod 2½ inches in diameter with a ⅝-inch hole bored through its length, which is known to the trade as "harrow spooling," and can be had from most supply houses in lengths up to four or five feet. It can be sawed as fast as the gains are measured and there is not an inch of waste, as two or more sections can be slipped over the bolt to make the required length. The ½-inch bolt

and necessary spooling cost no more than the spacing bolt and can be applied with less than half the labor. It may be added that even if telephone arms be used elsewhere, cable and terminal poles should invariably be fitted with standards, as the strains at these poles are entirely too great for the lighter pattern. In this connection the following estimate of the bolts required for a plant of 2,000 subscribers may be of interest, the writer's experience having demonstrated that it is not very far from being correct under average conditions:



½	
9 inches	250
10 inches	700
11 inches	1,000
12 inches	1,000
13 inches	700
14 inches	500
15 inches	600
16 inches	400
17 inches	200
18 inches	100

⅝	
13 inches	600
14 inches	600
15 inches	800
16 inches	400

FIG. 6.

All to be ordered with at least 3½-inch threads.

There remains only one other form of cross-arm fitting to mention—the side or alley arm. This fitting is made in several slightly different patterns by various manufacturers, the one illustrated being a fair sample of average practice. Like a self-supporting pole these arms should not be used except in cases of absolute necessity, as they certainly do not improve the appearance of a lead. There is little to be said concerning their application, save that the long brace should be bolted through the pole and the arms raised an inch or two at the outer end.

As soon as all the subscribers are shown on the maps it becomes a very easy matter to determine just how many arms are required for each pole. If we begin at the outside end of a lead and count the subscribers toward the cable pole it is evident that until we have reached five one arm only will be required, two from 6 to 10, and so on. If the poles are numbered the foreman of the cross-arming crew will receive an order in the following form:

Lead between First and Second streets. From D. P. 76.

D. P. 76	—	5	Double	Standards.
Pole 875	—	3	"	Telephone.
876	—	3	Single	"
877	—	3	"	"
878	—	2	"	"
879	—	2	"	"

O. K.

_____ _____

Supt.

If the poles have not been numbered the information may be given in some other form, but the numbering of the poles is a matter of so little expense and so greatly facilitates the keeping of accurate records that the writer would most earnestly recommend that it be done in every exchange, no matter how small.

Having received his order the foreman loads the required number of arms, fills his box with an assortment of bolts, washers and 4-inch lag screws, makes sure that each of his men is equipped with the necessary tools—hand-axe, monkey-wrench and lag-screw wrench; adds to the equipment one or more bolt cutters, a saw and framing chisel, a hard line and 4-inch block for each man and drives to the point of operation. The arms are distributed at each pole, as specified in the order, and while this is being done the lineman climbs the pole and measures its diameter through each gain which is to receive an arm. Thus, suppose the top gain measures 6 inches and the second 7 inches, it is evident that he will require one 10-inch and one 11-inch bolt, for, taking the upper gain, we have 6 inches and ¼ inch for the back washer, 2¾ inches for the arm, ¼ inch for the front washer and ¾ inch for the nut—a total of 10 inches. In other words, on single armed poles 4 inches should be added to the diameter through the gain to ascertain the length of bolt required when using telephone arms, and 4½ inches when using standards; for double telephone arms 7 inches and for double standard 9 inches. The groundman goes to the box for the required bolts, and while he is gone the lineman attaches his block by a loop of wire to the top of the pole and reeves his hand line through it. The groundman sends up the bolt and washers required for the bottom gain; the lineman drives the bolt through the pole from the side opposite to which the arm is to be attached, being careful to put a washer under the head of the bolt and is ready to receive the arm which the groundman hoists to him on the hand line. The accompanying drawing (Fig. 6) shows the method of hanging the block, as also a convenient method of attaching the arm to the handline.

The lineman having received the arm slips it over the end of the bolt with the braces away from the pole, puts on the front washer and nut and screws the latter home. He then adjusts the arm at right angles to the pole, being directed by his groundman, who steps back for the purpose, or by the foreman if he happens to be on the spot, brings the braces together, drives the lag-screw half way in with the hand-ax, screws it home with the lag-wrench and the operation is complete. Too much care cannot be given to sighting the arms, for nothing looks more ragged and unworkmanlike than a lot of arms "leaning all awry," and the foreman should keep sharp watch on this part of the work, moving up and down the line and correcting any errors he may discover. He should also make sure that the arms stand precisely at right angles to the lead as viewed from the side; if the framing has been properly done and the poles properly set they will do so, but it may be occasionally necessary to ease a gain slightly, for which purpose the saw and framing chisel are included in the tool equipment. The following arms are handled in precisely the same way, and when the pole is completed it should present the following features: All arms at right angles to the pole as viewed from a point in the lead; all arms at right angles to the lead as viewed from the side; all arms in one vertical line as viewed from the bottom of the pole. The photograph here reproduced (Fig. 7) shows a double-armed cable pole, which will, it is believed, present all these characteristics.

In double arming the process is substantially the same, save that the first arm of the pair has all five bolts (the ⅝-inch in the center and the four ½-inch spacing bolts) driven into it before being sent up the pole. The lagging for the spacing bolts is, of course, cut to the exact diameter of the pole between the gains and is slipped over the bolts before the second arm of the pair is placed in position.

So far we have dealt only with the poles in the aerial system. There remains the consideration of the fittings of the distributing poles along the subway. The protection of the cables rising up these poles will be postponed to the chapter on cables, and in this chapter we will discuss only the vari-

ous devices used to distribute the circuits from the pole to the subscribers. In the early days, cross-arms were used, applied exactly as on any ordinary cable pole—that is, five or less pairs of double arms all facing in the same direction. A moment's consideration will demonstrate the faultiness of this construction, for, the distributing pole being intended to serve an entire block, it is evident that the drops must run in all directions, sidewise as well as ahead, and it is very clear that no reasonable sequence of pin numbers is possible if many drops are to be run to the sides, for they must of necessity take the end pins, or else be knobbed along the arms to place. This difficulty led to the invention of the circle top, of which there are a number of different makes. Of these the "Gregory" is perhaps in most general use, although both the other forms have hosts of supporters. As a matter of fact they will all answer the purpose equally well, and it is entirely a matter of personal preference as to which is chosen. The writer, in one instance used three different circles on one plant with the idea of discovering which was the most economical, but could find no difference except in the matter of prime cost. The "Gregory" circle requires steel pins, whereas the "Pittsburg" is fitted with 1½-inch

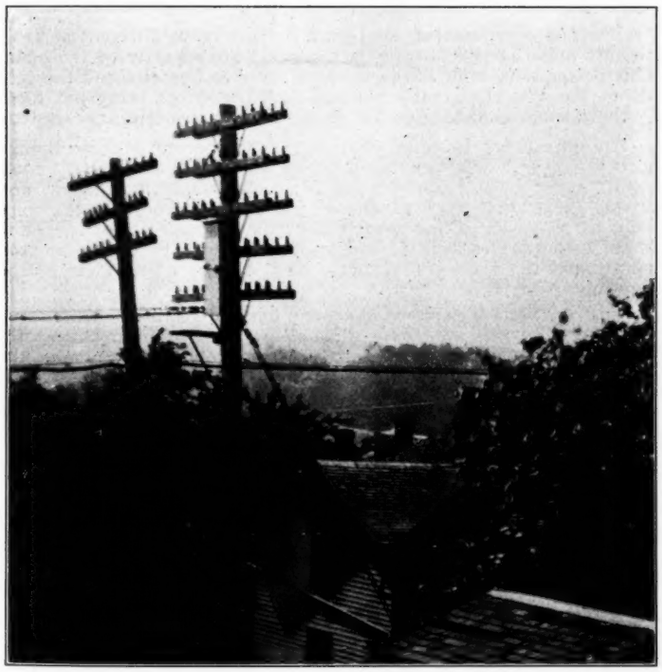


FIG. 7.

wooden pins and the "Hallett" uses an adaptation of the "Universal Iron" made by that company. The first form is made by the Therion Tool Works of Minneapolis, the second by W. H. Anderson & Sons of Detroit, and the third by the Hallett Iron Works of Chicago. In applying any of these circles, especially the first two, to a distributing pole great care must be taken to see that the brackets stand square with the pole, that the floor is perfectly level and that the collars fit the pole closely. The manufacturers always send out one circle completely assembled with each shipment, so no difficulty will be found in properly setting up the others. The details of squaring the pole, etc., will be discussed in a subsequent chapter on terminals and protectors, as the same depend very largely on the form of terminal adapted.

The most modern practice has, curiously enough, returned to the old cross-arm idea, but with this important difference that, instead of five pairs of double arms facing in one direction, but two pairs of arms are used, facing at right angles to each other and fitted with steel brackets, as illustrated. That this practice represents the acme of economy and efficiency needs no demonstration for the two pairs of arms will accommodate forty drops, and if more be required it is only necessary to add further arms as needed. It may be objected that the iron circle is practically indestructible, whereas the arms will decay in the course of time, but it must be remembered that the arms, if of first quality, will last at least as long as the pole and possibly as long as the iron circle, unless the latter be given an occasional coat of graphite paint, in addition to which the arms can be renewed several times for the amount of the prime cost of the circle.

All poles set at intersections and at other points where traffic is considerable should be protected against damage from passing drays and wagons. This is especially true of the distributing poles, which are of necessity set at or near alley intersections in the business district where the heaviest teaming is carried on. The supply houses show in their catalogues a somewhat elaborate arrangement of protection strips and hub plates, but these are rather expensive and it is questionable if they are nearly as efficient as a sheet of No. 18 galvanized iron applied around the pole. This iron should extend from a point one foot from the ground three or four feet up the pole; it is best applied by first nailing down one edge and then straining the sheet around the pole by means of a bar and loop of heavy wire, the bar being thrust through one end of the loop and the other end slipped over a spike driven into the pole for the purpose. This makes a cheap and thoroughly adequate protection and one that should last as long as the pole. It is also common and very good practice to serve the pole with No. 12 galvanized wire for three or four feet from the butt, the adjacent wires being separated about ¾ inch and fastened in place by heavy fencing staples applied three to each turn of the wire.

In concluding this chapter, it may not be out of place to repeat that all work about the pole lines should be neat to the point of fastidiousness. The character of the plant is judged from the appearance of that part of it which is visible, and assuredly trim, workmanlike pole lines, perfect in every detail, go a long way toward inspiring confidence in both stockholders and the telephone public.

(To be continued.)

DEATH OF JOHN I. SABIN.

John I. Sabin, father of the telephone system of the Pacific Coast and president of the Pacific States Telephone and Telegraph Company, died at San Francisco, on October 10, after an illness of a week. The disease which carried him off was rheumatism, contracted as the result of cold which he received upon a walking trip a few weeks ago.

Mr. Sabin, entirely through his own efforts and ability, rose from the humble place of a Western Union messenger boy to a position at the head of a large and powerful corporation. Throughout the western country he was known as the father of the telephone system on the Pacific Coast.

He was born in New York City in 1847 and began his work in life as a telegraph messenger boy. He familiarized himself with telegraphy and when but 17 years old he came to California with the Collins Overland Telegraphic Expedition, after having served through the war as a telegraph operator. His first important work was to assist in establishing a wire across the Bering Straits, by which a method of communication with Europe was opened.

In 1869 he went to Los Angeles and three years later he married Miss Laura Perkins, after which he came to San Francisco, still remaining with the Western Union Company. In a short time he was offered the superintendentship of a department, and from that time his rise was assured.

Telephone Tales Tersely Told

The Brighton, Iowa, telephone exchange, formerly owned by G. W. Smith, has been purchased by the Brighton Mutual Telephone Company.

The Home Telephone Company of Los Angeles, California, has purchased a site and will at once construct a new building, which will be equipped with up-to-date apparatus.

The Consolidated Telephone Company of Buffalo, New York, has bought the Elmira Telephone Company and the Marilla Telephone Company. The exchanges will be added to the Consolidated company's lines.

The Ontario Telephone Company, of Oswego, New York, has awarded the contract for erecting its new building to A. Paine & Son, the contract price being $20,000. The structure is to be thoroughly modern.

The Paducah Home Telephone Company of Paducah, Kentucky, which has recently taken over the business of the People's Telephone Company, is improving the plant and is making arrangements for extensive business.

The Citizens' Telephone Company of Sheboygan, Wisconsin, has sold its toll line between Dacada and Fredonia by way of Random Lake to Silver Creek to W. B. Krause and M. Schmidler of Port Washington and Dr. Mallory of Random Lake.

The Saline Telephone Company of Saline, Kansas, has just completed the work of cabling its exchange at this place. Another section of switchboard will be added to its system in the near future, at which time 3,000 feet of 25 pair cable will also be added.

The Jones & Winter Company of Chicago, who was recently granted a franchise for an underground telephone system in Hattiesburg, Mississippi, have filed with the city council their acceptances of the franchise, and work on the system will commence at once.

The Hastings Independent Telephone Company of Hastings, Nebraska, is pushing the work of construction and will at once begin the installation of instruments. The subscription list is growing rapidly and the company expects to have 600 telephones in operation by the first of the year.

The Indiana, Pennsylvania, Telephone Company's system will be completely overhauled, by installing up-to-date telephones where old ones are now, and the substitution of underground cables for overhead wires. Many of the country lines will be rebuilt, the metallic current being installed all over the system.

The Eastern Utah Telephone Company, recently incorporated at Price, Utah, by R. G. Miller and his associates with a capital stock of $50,000, has purchased the telephone line from Price to Ferron from Levi N. Harmon and associates. Contracts will be let for building additional lines. About $20,000 will be expended.

The Converse Telephone Company of Converse, Indiana, which for the past five years has been a sub-licensee of the Bell company, has severed its connection with that company and now connects only with the Independent system. The company has transferred a portion of its stock to a number of experienced telephone men.

The Home Telephone Company of Utica, New York, has inaugurated a direct service between Utica, Amsterdam, Schenectady, Troy, Albany, Saratoga, Glens Falls and other places in eastern New York. The new territory to which Home telephone subscribers now have access includes 275 stations, having over 16,000 telephones.

Six rural telephone lines, leading into Palouse, Washington, have formed an Independent telephone system, with both local and long-distance connections. The following lines are in the system: Turnbow, Parker, Garfield, Cove, Ickes and Boone rural lines. Through this central office the farming community will be enabled to talk with Palouse, Moscow, Colfax, Pullman, Garfield and Princeton.

The Home Telephone Company has installed a new switchboard in the plant at Hollywood, California, with a capacity of 400 lines, making it possible to operate 600. The plant was opened about a year ago with less than fifty subscribers and now has 230, with a day and night service. Ten trunk lines into the city were inadequate to accommodate the public, and it has been necessary to put in an additional ten.

Recently the Sandusky (Ohio) Telephone Company inaugurated a telephone system at a rate of one cent per call. A great many slot machines have been in use in Sandusky heretofore, and contracts are now being signed up by almost everyone who has, in any way, any use for the system. The company reports that the new one-cent rate has met with a hearty response, and promises to become very popular.

The Heath Telephone Company of Greenfield, Massachusetts, has purchased all the property of the Rowe Telephone Association, the change of management to go into effect October 1. A number of new subscribers will be connected with the system in Rowe as soon as the change is made. The Heath company is making extensions in Colrain, Buckland, Charlemont and Hawley, and its subscribers now exceed 750.

The Home Telephone Company of Dayton, Ohio, which started business in October, 1903, now has 4,800 subscribers in the city and is adding to its list at the rate of 100 a month. It has twelve exchanges in the county, outside of this city, and has just completed an exchange at Centerville, with 125 subscribers and 50 names on the waiting list. The company is constructing an exchange at Miamisburg. H. P. Miller is manager of the company.

The Long Distance Telephone and Telegraph Company of Alabama, with headquarters at Birmingham, Alabama, has almost completed its long distance line connecting Birmingham with Bowling Green. It is the intention of the company to establish its long distance system throughout the southern states in competition with the Bell. Arrangements have been made to connect with the long distance lines operating in the north at Bowling Green.

The Home Telephone Company of Bowling Green, Ky., has just completed the task of putting in about two miles of cable in that city. It has also made a number of extensions in different parts of the city and county and greatly increased the capacity of the plant. This company is daily adding to its already fine service and the people of the city are greatly pleased with the effort being put forth by the management to give the people a first-class telephone system.

An amendment has been filed by the incorporators of the Boonsboro & Stillwell Telephone Company of Cane Hill, Arkansas, changing its name to the Cane Hill and Stillwell Telephone Company and raising the capital stock to $10,000. It is the purpose of the company to construct a line from Cane Hill through Clyde to Dutch Mills, with the privilege of constructing other lines in Washington county and the Indian Territory. B. J. Parker is president of the company.

The Tri-State Telephone Company has rented offices in Brownsville, Pa., and will soon extend its county service from Uniontown and other parts of the county to Brownsville and other towns in the Monongahela Valley. Connection will be made at West Brownsville with the Union Telephone Company of California, Pa., which will give service at California, Coal Center and other lower river towns. The Tri-State has 12 exchanges in Fayette County, and about 3,000 subscribers.

The Consolidated Telephone Company of Pennsylvania has arranged to improve the Allentown Independent telephone system, the principal item of the improvements being a switchboard which will cost $68,000. When the company was originally organized it was figures that there would be about 400 subscribers and a switchboard was put in capable of taking care of three times that number. The growth, however, has been so large that the number of lines has been increased till it now stands around 2,500.

The Board of County Supervisors has passed a resolution by which the telephones now in use in all county offices and buildings in Sioux City, Iowa, are to be replaced by those of the local company, service to begin November 1. Soon after its new system was started, the Sioux City Telephone Company installed its telephones in all the offices of the county building as an experiment. The service being satisfactory, the board was disposed to give its support to the home institution and contract was made for two years.

At a recent meeting of the Board of County Commissioners, at Bremerton, Washington, the Northwest Peninsula Telephone & Telegraph Company was granted the right to use 76 county roads and numerous streets and alleys in unincorporated towns in the county for the purpose of erecting and maintaining telephone and telegraph systems therein, for a period of fifty years. The company now operates the telephone system in Port Orchard, Charleston and Bremerton, Washington, as well as to other places in the county.

The parties interested in the organization of an Independent telephone company in Hartford, Connecticut, have asked for a charter for the new Citizens' Telephone Company, which will enable them to start with a capitalization of $1,000,000, with the privilege of raising this to $10,000,000. Should the charter be granted, it is the intention of the company to give the state one of the most up to date and thorough telephone services possible. D. A. Reynolds of the State Line Telephone Company of New York city is foremost in promoting the movement.

The municipalities of Manitoba, Canada, have signed for presentation to the legislature various petitions asking that body to take over and operate the telephone systems in the province. It is stated

that at Neepawa a public service at low rates has been instituted with financial success. An effort is being made by a number of Chicago business men to secure a franchise in Winnipeg to compete with the existing system. A report made shows that Winnipeg has a telephone for every thirteen inhabitants, which it is claimed is the highest average for any city in the Dominion.

The Tri-State Telephone Company, the long distance department of the Twin City Telephone Company of Minneapolis, has consummated a deal whereby it has come into possession of over 300 miles of line in northern Minnesota, covering sixteen exchanges and rural lines, and giving the purchasers practical monopoly of the telephone situation in ten counties. The property, formerly owned and managed by the Minnesota Mutual Telegraph & Telephone Company and the Maple Leaf Telephone Company, with general offices at North Branch, Minn., has been in operation eight years.

The Indiana Independent Telephone Association has issued a pamphlet describing the plan of organization, giving the operating rules adopted and facts and figures on the Independent telephone companies of Indiana. The pamphlet states that there are 368 Independent telephone companies in the state, 15,000 stockholders, 175,000 subscribers, 30,000 miles of toll line, 1,500 toll offices, fifteen million dollars of capital invested and that the gross earnings of last year were $3,500,000. Charles S. Norton of the New Long Distance Telephone Company is secretary of the association.

A large telephone deal, which has been pending for some time, was consummated recently, when Frank A. Knapp of Bellevue, Ohio, purchased from local parties the controlling interest in the Local Telephone Company and the Bellevue Home Telephone Company. The Local Telephone Company operates in Huron and Crawford counties and has 4,200 telephones in use and over 200 miles of toll lines. It is understood that associated with Mr. Knapp are some of the strongest Independent telephone interests in the state. The deal carries with it the control of telephone properties representing an investment of over $400,000.

Reno, Nevada, has the unique distinction of having the world's record for telephone service. By three-quarters of a second it has New York defeated, and by one and one-quarter seconds the model system of San Francisco is laid in the shade. This was demonstrated in a test recently made. The average time for a number of switches, called for on different parts of the system, was seven seconds. San Francisco's record is given as eight and one-half seconds, while New York, conceded the fastest in the world, has a record of seven and three-quarter seconds Reno now comes to the front with seven seconds flat.

The Bureau County Independent Telephone Company of Princeton, Illinois, having outgrown its old quarters, is erecting a new building. New equipment of the latest pattern will be installed. This company was organized and incorporated about six years ago with a capital stock of $20,000, which has been increased several times until it now has an authorized capital stock of $200,000. Starting with two small exchanges, the system has grown until it now owns and operates ten exchanges with 3,600 subscribers and more than 300 miles of toll lines. It is one of the strongest companies in the state. C. O. White is secretary and general manager of the company.

Oakland, California, has a new Independent automatic telephone system in operation, at least a considerable portion of the work of installing such a plant has already been done. About two years ago W. A. Beasley obtained a franchise for the establishment of an Independent telephone system in Oakland. This franchise was subsequently transferred to the Oakland Home Telephone Company, which was organized for the purpose of building the system. The company's plans are to install the automatic system over the whole of Oakland. All of the work will be of first-class character and it is intended the subscribers will all be furnished with telephones as fast as the apparatus arrives from Chicago.

A consolidation of all the trunk lines surrounding Paris, Illinois, has been consummated, the organization to be known as the Citizens' Mutual Telephone Company. The lines included are: Vermillion, Flemington, Nevins, Brocton, Libertyville, Dana, Marshall, Grandview, Redmon, Chrisman, Newport, Sanford, Clinton and Scott Land. The new company will construct a complete circuit around Paris, and while it does not enter Paris it will have first-class service with Terre Haute. An effort will be made to enter Paris over the lines of the Wabash Valley Telephone Company. If this should fail a proposition will be submitted to the city council asking for a franchise, on conditions acceptable to the city.

There has been formed in Marion, Indiana, a new combination of Independent telephone interests, including the Converse Telephone Company, the Winchester Telephone Company, Delaware and Madison Counties Telephone Company of Muncie, and the Home Telephone Company of Fort Wayne. Officers have been elected as follows: President, Thomas Bromley, Jr., Muncie; vice-president, L. T. Barger, of Converse; secretary and treasurer, O. L. Barger, of Converse. The executive committee consists of the officers and J. E. Brown of Winchester. The purpose of the organization is for mutual advantage in extending toll systems. Some of the most prominent men of the state are interested in the new combination.

Personal

E. W. Moore of the Everett-Moore syndicate recently returned from a two months' trip to Europe. Mr. Moore says that the financial houses of Europe look very favorably upon American securities at the present time and that they regard the outlook for higher prices as exceedingly good. Mr. Moore stopped in New York on his way to Cleveland and talked with some of the members of the large financial houses in that city. He says that most of them are exceedingly optimistic regarding the next year in the United States. They believe generally that it is going to be a year of prosperity and that all good securities are due for a material increase in market value.

E. W. MOORE.

Mr. Moore is exceedingly well posted on telephone securities and a statement from him on the outlook carries a great deal of weight. He is of the younger group of American financiers, and has been connected with a great many large Independent telephone deals beside his other varied interests. He is one of the principal factors in the financial side of Independent telephony and is devoting a large share of his time to his telephone properties, which have become very large and require a great deal of attention.

Lewis Blades has applied for a telephone franchise in Hope, Indiana.

C. M. Hoover has been granted a telephone franchise in Calistoga, California.

O. P. Kiker has purchased the business of the Tolar Telephone Company at Tolar, Texas.

W. B. Lusk has been granted permission to erect a telephone line in Weatherford, Texas.

W. S. Raish has purchased the business of the Silver Creek (Neb.) Telephone Company.

W. C. Moeller has purchased the telephone business of W. J. Skewis in Rock Valley, Iowa.

J. B. Cowan is now sales manager for the General Storage Battery Company of New York City.

H. F. Barbour has been appointed manager of the Mutual Telephone Company at Alpena, Michigan.

W. R. Thomas of Warren, New York, has been appointed manager of the Warren Telephone Company.

W. A. Chamberlain of Constable, New York, is building an Independent Telephone line to Huntington.

P. Kerr Higgins of Los Angeles, California, has applied for a telephone franchise at Hanford, California.

J. B. Titus and D. W. Mott have made application for a telephone franchise at Santa Paula, California.

J. B. Pierce will act as general manager of the Independent Telephone Company of Syracuse, New York.

M. H. Leaver has been elected president of the Franklin Telephone Company of Quakertown, Pennsylvania.

The trustees of Calistoga, California, have adopted an ordinance granting a telephone franchise to C. M. Hoover.

O. Shefferd has succeeded L. Middledorf as manager of the Carroll County Telephone Company at Carroll, Iowa.

Fred M. Hess will at once construct a telephone system at Bishop, California, under a franchise secured recently.

W. C. Dillon has been appointed superintendent of the People's Home Telephone Company of Birmingham, Alabama.

J. Cushman has been appointed manager of the Butler County Telephone & Electric Company of El Dorado, Kansas.

E. N. Nelson has succeeded T. W. Wigton as manager of the Roland Mutual Telephone Company at Roland, Iowa.

F. A. Adams of Claflin, Kansas, has become sole owner of the local telephone system, having purchased the other interests.

E. W. Goron, formerly manager of the Commercial Telephone Company's exchange at Nacogdoches, Texas, has been appointed

manager of the Grayson County Telephone Company's exchange at Dennison, Texas.

W. A. Wynne of Raleigh, North Carolina, has secured a franchise to install and operate an Independent telephone system.

R. D. Cannon has been appointed general superintendent of the Mississippi Valley Telephone Company of Burlington, Iowa.

Benjamin Burkett has been appointed manager of the Home Telephone Company at Lindsey, Ohio, to succeed J. W. Brenneman.

R. D. Cannon, general superintendent of the Mississippi Valley Telephone Company, has moved to Burlington, Iowa, from Minneapolis.

M. H. Wheeler of Charlotte, North Carolina, has been appointed manager of the Greenwood (S. C.) Telephone Company, to succeed W. H. Dumont.

Arthur Barton, formerly owner of the telephone system at Salem, Iowa, has disposed of the same to W. C. Monger, who will take charge of it at once.

President Frederick P. Fish of the American Telephone and Telegraph Company, who has been abroad on a six-week vacation trip, returned recently.

Earl D. Selmser, formerly of Johnstown, New York, has been appointed assistant superintendent of the Sandusky Telephone Company of Sandusky, Ohio.

A. T. Maxwell, formerly of Savannah, Ga., has been appointed general traffic manager of the Memphis Telephone Company, with headquarters in Memphis.

M. Laughlin has been appointed superintendent of the Chillicothe and McArthur Telephone Company at McArthur, Ohio, to succeed John McGonigle, resigned.

E. H. Davenport of Columbia City, Indiana, has been appointed manager for the Whitley County Telephone Company, with headquarters at Columbia City.

R. W. Crawford, formerly manager of the Rhinelander (Wis.) Mutual Telephone Company, has resigned to accept the position of district manager at Stevens Point, Wisconsin.

Theodore Gary, the Macon (Mo.) capitalist, who recently purchased the Home telephone system in Independence, expects to start improvements in the newly acquired plant.

D. R. Craig, formerly of Aurora, Illinois, will superintend the construction of the Underground work of a new telephone plant to be built by New York capitalists in Havana, Cuba.

J. W. Krueger, who has been identified with an electrical supply house in St. Louis for some time, is now associated with the Manhattan Electrical Supply Company of New York city.

Owen M. Burgess of Nashville, Tennessee, has been appointed superintendent of maintenance with the Kinloch Long-Distance Telephone Company, with headquarters in St. Louis, Missouri.

J. F. Stockwell, formerly general manager of the Ontario Telephone Company of Oswego, New York, recently assumed the general management of the Independent Telephone Company of Syracuse.

M. A. Joy of Terrell, Texas, has made application to the city council for a franchise to operate a telephone system, and a committee has been appointed by the council to consider the matter.

W. C. Ross, superintendent of construction for the United States Long Distance Telephone Company, has started the construction of a telephone line at Tucson, Arizona, which will extend to San Diego, California.

C. E. Lee, the well-known representative of the Electric Gas Lighting Company of Boston, was in Chicago the first of October. Mr. Lee reports good business, the demand for his company's product being exceptionally brisk.

Judson Smith of Scranton, Pa., who has been associated with the Consolidated Telephone Company for several years, has been appointed superintendent of the Anthracite Telephone Company, with headquarters at Forest City, Pa.

C. M. Weeks, A. B. Swain and others of Sabastapool, California, have incorporated the Gold Ridge Improvement Company at this place with a capital stock of $11,500, for the purpose of owning and operating telephone and telegraph lines.

A. J. Lathouse, superintendent of the Citizens' Telephone Company of Columbus, Ohio, has resigned to enter the business of constructing telephone exchanges and electric light plants, a company having been formed by him for that purpose.

S. S. Sandberg, formerly of the switchboard department of the Chicago Telephone Supply Company of Elkhart, Indiana, has accepted a position in the switchboard department of the Monarch Telephone Manufacturing Company of Chicago.

L. Rust and T. H. Sharp of San Angelo, Texas, have purchased the Del Rio telephone exchange of C. W. O'Dell for a consideration of $6,300. Extensive improvements will be made in the near future and long distance connections will be established at once.

A. A. Burch, manager of the Citizens' Telephone Company of Battle Creek, Michigan, states that the outlook for Independents in that state is very bright. His company continues constructing many new toll lines. The Battle Creek exchange of the Citizens' Company is receiving orders for telephones faster than it can fill them.

H. A. Nuttall has returned to Chicago from Fort Worth, Texas, where he spent the past two months and succeeded in adding over eight hundred subscribers to the Independent telephone exchange at that place. The Fort Worth local service is to be greatly improved and outside connections are also to be secured in the near future.

J. W. Callahan, who recently purchased the Bainbridge (Ga.) Telephone Exchange, has begun the work of remodeling the entire system, and in a short time Bainbridge will have a system the equal of those in most of the large Southern cities. Mr. Callahan expects to expend about $20,000 in improvements and new equipment. The central energy system will be installed.

G. L. Lindsley, president and senior partner of the Lindsley Bros. Co., one of the largest firms of pole dealers operating in the telephone field, was married on October 10 to Miss Marie Stone, the ceremony being performed at the home of the bride's father, P. F. Stone, in Rockford, Ill. Mr. and Mrs. Lindsley will be at home after December 1 at 1304 Main street, Menominee, Mich.

I. H. Griswold and T. M. Brush, director of the Home Telephone Company of Rome, New York, have resigned and have been succeeded by George L. Fuller of Rochester and C. H. Poole of Utica. The company expects to spend about $5,000 in improving and extending its lines. A. L. Ketcham has been appointed assistant superintendent and secretary of the company, in charge of the local exchange.

William Mullendore and Frank and Victor Smith have disposed of their holdings in the Franklin (Ind.) Telephone Company, to Louis Hollweg, president of the Independent Telephone Company of Indiana. F. Strickler, one of the stockholders in the Franklin company, retains his interest and will be placed in charge of the local plant. The new directors plan extensive improvements and much better service.

M. W. Lott and Fred Beerstecher, representing the Three Rivers Telephone Company of Three Rivers, Michigan, are completing arrangements for building a telephone exchange at Centerville, Michigan. The company already has about a thousand telephones in use in the county. It is the intention of the company to build rural lines in all directions from Centerville and have an exchange of at least two hundred within a year.

P. C. Higgins has filed a new application for a telephone franchise with the city council of Stockton, California. In case the local franchise is granted it is the intention of the Home Telephone Company of Los Angeles to use Stockton for a distributing point for the San Joaquin Valley. It is estimated that the cost of the entire system would be from $300,000 to $400,000. Mr. Higgins represents the Home company of Los Angeles.

W. C. Polk of Toledo, Ohio, representing the Central Telephone Construction Company, has begun the work of overhauling the plant of the Home Telephone Company at Mobile, Alabama, which the Bell company made an effort to purchase a short time ago and failed. The work is preliminary towards arranging for a long-distance service which the company proposes to establish, and which, it is said, will extend as far as Syracuse, New York.

George P. Low of San Francisco has severed his relations with the *Journal of Electricity, Power and Gas,* and is now engaged in the specialization of engineering work, from its literary side more particularly. Mr. Low has for some years done a great deal of work in the field of technical literature, and will now be free to devote his energies to the description of engineering installations and properties, the prospectuses of new industries, etc.

George A. Gray, for some years connected with the Electric Appliance Company, and now vice-president of the Thomas G. Grier Company at Jackson and Desplaines streets, Chicago, was married on September 20, at the Sacred Heart Church in Melrose Park of that city, to Miss Margaret Beatrice Spofford. After an extended tour of the Northwest, Mr. and Mrs. Gray will be at home after October 15, at 151 Fourteenth street, Maywood, Illinois.

S. A. Hoskins of Wapakoneta, Ohio, John A. Quisenberry of Danville, Kentucky, and Frederick Bimel of Portland, Indiana, a committee representing the bondholders who purchased the property of the Commercial Telephone Company, operating in central and southern Texas, have reorganized the company, increasing the capital stock to $500,000. Plans have been formed for the extension and improvement of the system, which extends over 1,000 miles.

Prof. L. I. Blake, head of the department of electrical engineering at the University of Kansas, has been granted a year's leave of absence by the board of regents. Prof. Blake has been appointed chief engineer of the new submarine signal company, which handles his invention of telephoning between ships, using the water as a medium. He made this important discovery while a student in Berlin, and has been perfecting his invention. The system is already being used between American warships, and has recently been adopted by the German government.

Conventions of Independents

INDIANA, SEVENTH DISTRICT MEETING.

Independent telephone companies of the seventh Indiana new telephone district, comprising Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan and Shelby counties, were represented in Indianapolis Wednesday afternoon, Oct. 11th, at the first quarterly convention of the district, at the office of C. S. Norton, assistant secretary of the New Long Distance Telephone Company. The men present, whose district contains about 35,000 of the nearly 200,000 Independent telephones of the state, were welcomed by Mr. H. B. Sale, general manager of the New Long Distance Company, and the president of the district, whose address follows:

ADDRESS OF H. B. SALE.

It gives me great pleasure, indeed, to welcome you to the city of Indianapolis, for the purpose of organizing the most important district, as well as the stronghold of the Independent movement in the state of Indiana.

When you consider the fact that in Marion county, alone, there are more than twice as many Independent telephones as those of the Bell, and that in the surrounding counties which this district represents there are at least six times as many Independent telephones as there are Bell, you will comprehend what I mean when I say that you are in the stronghold of the Independents in the state of Indiana.

There is no district wherein the capital of the state lies, where such a condition exists as that which exists in Indiana, and we should all rejoice in the great achievement which we have attained. While the Central Union Telephone Company is exerting every effort, by solicitation, persuasion, free telephones, and every other means which their corps of special agents can devise to obtain telephone subscribers, the Independent companies are exerting every effort to meet the unsolicited demand for telephones.

The greatest trouble which the Independent companies have heretofore experienced, has been the lack of organization, and lack of knowledge of the magnitude of their own business. Their mental attitude has been that of considering the Bell company a giant corporation, which could swallow them up, or trample them under foot, if it so desired. This is an absolutely absurd standpoint, because it would be utterly impossible for them to accomplish such a feat, even though they had the money. The proper thing for the Independent companies of Indiana to do, now, is to strengthen the weak members in the organization, who still maintain this attitude, and give them to understand, as well as letting the people understand, that the Independent movement is a permanent thing, and will be—as it has been in the past—the greatest commercial and financial institution in the state.

There is invested in Independent telephone property in the state of Indiana, fifteen million dollars—this for legitimate installation of telephones and toll lines. While I have no doubt the Central Union Telephone Company, and its parent, the American Telephone and Telegraph Company, have spent approximately seventy-five per cent of the amount of money in the state of Indiana, in installing telephones and getting new business, they have, for their expenditure, something less than 30,000 telephones, whereas the Independent companies have more than 170,000 telephones for their expenditure, which is approximately six times as many as has the Bell company. Considering the fact that we have never had connection with Chicago or Cincinnati—the two largest business centers outside the state, with which the people of the state of Indiana transact business—this is marvelous; and judging from movements with which I am familiar, this condition will not long exist, in that Cincinnati and Chicago will be compelled to have Independent telephone plants, to maintain the business from this state which they have been enjoying.

The United States Independent Telephone Company—of which you have all read, in the last few days—is an institution of great magnitude. It has connected with it men of high standing, who have been very successful in their individual lines of business, and have unlimited capital at their command, upon which they wish to realize profits and interest. We shall probably not feel, directly, the results of any of their capital investment in the state of Indiana for some time, but the moral support which they will give the Independent movement will be of greater magnitude than any movement which has heretofore been accomplished.

They have absorbed one of the largest telephone manufacturing companies in the country—which assures us beyond a doubt that we will at least have one manufacturing company which owns valuable patents and manufactures first-class apparatus, which will not be controlled, either in its policy or manufacture of apparatus, by the American Telephone & Telegraph Company, or any of its licensees.

In addition to this, they have obtained, and have ready for operation, a franchise in the city of New York, which has been termed by some of the newspapers, in recent comments in the organization of the company, the "Gibraltar of the Bell Telephone Company." I believe that this fact will bring the American Telephone and Telegraph Company to the realization that they have not a competitor which is a mere toy, and that they will hereafter adopt a policy on broader lines than that which they have followed, in that they will acknowledge the Independent movement as a legitimate competitor—the same as every other competitive business has done heretofore—and will not exert their efforts to fighting the Independents, but, rather, to a legitimate competition to obtain business, and that the company which gives the best service and treats the public as it should be treated, will obtain the most patronage and have the best standing in the minds of the people. The Independent movement has been the growth and outcome of the necessity for good service and courteous treatment, and it therefore stands to reason that the Independent companies will continue to grow and prosper as they have heretofore, and the Bell will only get such business as they can obtain through the influence of adequate toll line facilities.

When you consider that the New Long Distance Telephone Company, alone, has more circuit miles than the Central Union and American Telephone and Telegraph Companies had, prior to the inception of the Independent movement, you will realize what has been done in the long distance service—especially when you consider the fact that the New Long Distance Company owns about one-half of all the toll lines in the state. I have no doubt that within the next year very large extensions will be made by the New Long Distance Company, which will give all points within the state ample facilities for their toll business.

I congratulate you all upon your tenacity of purpose and loyalty to the movement, and I hope that the spirit of the 7th district will pervade every district in the state of Indiana, and that the example which you set in this district will be followed by every other district.

Mr. C. S. Norton, secretary of the Indiana Independent Telephone Association, explained the plans and purposes of the association. Reports were made from various companies of the district. The representatives of the companies present nearly all signed the constitution and by-laws of the state association. Those who did not sign agreed to do so as soon as their directors could be brought together. Fifty-two of the sixty companies comprising the district were represented.

OHIO, FOURTH DISTRICT, MEETING.

A meeting of the representatives of the fourth district of the Ohio Independent Telephone Association was held at Portsmouth, October 12. About thirty-five of the prominent telephone men of Ross, Pike, Adams, Pickaway, Fayette, Vinton, Highland, Clinton and Scioto counties were present.

The vice-president of the district, G. P. Thorpe, of Wilmington, was detained at home by sickness, and the meeting was presided over by H. P. Folsom, of Circleville. C. D. Duncan, of Chillicothe, was made secretary of the meeting. Reports from the various counties representing the district were read, and the business of the meeting was transacted in an informal manner, there being no program. The Independent movement, by the reports heard, shows growth all along the line, as was evidenced by the many encouraging reports. The meeting was an enthusiastic one and was one of the best ever held in the district. A committee was appointed to ascertain the exact number of subscribers each company has and this information will be placed in the hands of the secretary.

Last March at the annual state meeting in Columbus, the fourth district reported as follows:

Number of Independent subscribers, 11,335; number of Bell subscribers, 4,093. October 12 the report reads as

follows: Number of Independent subscribers, 12,263; number of Bell subscribers, 4,389.

Among those present outside of the district were F. L. Beam, Mt. Vernon, Ohio, president of Ohio Independent Telephone Association; Ralph Reamer, Columbus, Ohio; M. B. Overly, Cleveland, Ohio; W. R. Fee, Milford, Ohio; W. S. Thompson, Hamilton, Ohio; C. Y. McVey, Cleveland, Ohio; D. E. Sapp, Mt. Vernon, Ohio; E. L. Coen, Vermillion, Ohio; J. W. Brooks, Cleveland, Ohio; L. H. Hutchison, Huntington, W. Va.

The district members present were as follows: E. Humphry, Waverly; D. T. Blackburn, Rarden; W. G. Rhoten, Mowrystown; H. P. Folsom, Circleville; J. F. Schley, Circleville; G. Joseph, Circleville, E. W. Lutz, Circleville; C. D. Duncan, Chillicothe; Joseph S. McKell, Chillicothe; H. S. Grimes, Portsmouth; A. H. Bannon, Portsmouth; Dr. W. D. Tremper, Portsmouth; E. E. Knox, Portsmouth; L. A. Eaton, Proctorville; H. B. Mauck, Proctorville.

OHIO, SIXTH DISTRICT, MEETING.

A meeting of representatives of the sixth district of the Ohio Independent Telephone Association was held at Piqua, October 10. The sessions were held in the parlors of the Hotel Plaza. The vice-president for the district, I. H. Theidick, of Sidney, called the morning session to order at 10 o'clock. The entire business was transacted in an informal manner, there being no set program. Reports from the several counties comprising the district took up the greater part of the time. These showed an increase of thirty per cent since last March when a report was made at the state convention.

Last March the reports made the following showing: Number of telephones in the district, 24,000; number of exchanges, 63; toll stations, 174; stockholders, 1,488. In the same territory the Bell people had 11,381 telephones, 15 exchanges, 112 toll stations and no stockholders.

To-day's reports show there are 32,000 Independent telephones in this district, against 12,294 of the Bell. Quite a number of new exchanges are reported, including those at Botkins, New Knoxville, Yorkshire, Bloomer, Johnsville, Hollansburg, West Jefferson, Miamisburg, Centreville, Spring Valley, Englewood. The reports show a very remarkable growth all over the state.

Last March when reports for the state were submitted the total number of Independent telephones was 196,937, as against 104,318 of the Bell. Of the latter company's total 20,000 are in Cincinnati and Hamilton county. The Independents have 668 exchanges to 159 of the Bell. They also had 1,452 toll stations to 743 of the Bell. There are 17,029 Independent stockholders in Ohio. There are none holding Bell stock.

These meetings are held twice or thrice a year and are for conference and mutual improvement. The effect is to strengthen greatly the Independent telephone movement. They bring together men whose interests are the same and set them to working and talking about the same things. They strengthen and hold together and in many ways have been found to be valuable.

Among those present at the meeting were Frank L. Beam of Mt. Vernon, president of the Ohio Independent Telephone Association, and M. B. Overley, representing the United States Long Distance Lines of Cleveland.

INDIANA, FIRST DISTRICT, MEETING.

A meeting of the members of the Indiana Independent Telephone Association of the first district, which includes the counties of Elkhart, Fulton, Kosciusko, Lake, Laporte, Marshall, Porter, Stark and St. Joseph. was held in South Bend on October 4 and 5. There was much enthusiasm and interest shown in the meeting and the attendance exceeded expectation. Theodore Thorwood, president of the South Bend Telephone Company, and also vice-president of the first district, presided, the sessions being held in the Commercial Club rooms. The object and purposes of these district meetings, as set out by the state association, are to encourage development, foster and stimulate the growth, protect the mutual interests, promote and systemize uniformity of accounting, operation, maintenance, construction and standardization of Independent telephone interests, and to defend the same from unfair encroachment or competition by co-operation and other available means deemed advisable.

Many interesting and profitable topics relating to the progress of the telephone business in the first district were discussed. Plans were also perfected to further the extension of lines in all localities, and especially those leading into Chicago, which, it is thought, may be accomplished in a short time. Automatic service and apparatus were discussed and explained.

The various exchange managers present reported 16,109 telephones in use in the district. This is regarded as a wonderful growth, since there were less than 12,000 telephones in use in the district a year ago. After making preparation for the state convention, to be held in Indianapolis, and also for another district meeting prior to the state convention, the business session closed. A banquet held at night, with the usual social features and responses to toasts, was a pleasing finale of the meeting. The following prominent telephone men were in attendance: John O. Harney, assistant secretary of the National Association; George W. Beers of Fort Wayne, president of the Indiana association; Charles S. Norton of Indianapolis, secretary of the Indiana association; Jesse W. Weike, president of the Greencastle Telephone Company. The following managers of Indiana telephone companies in the district were in attendance: G. W. Ritter, Syracuse; J. W. Rowabaugh, New Paris; G. H. Vanvusen, Michigan City; M. C. Crow, Elkhart; W. L. Shoots, Goshen; W. D. Coffman, Dunlap; C. A. Lemmert, Teegarden; A. C. Schalliol, Klondyke; Daniel Agnew, Rochester; S. W. Groves, Calmar; W. F. Daniels, Knox; J. C. Wolf, Aetna Green; Frank W. Brown, Wakarussa; C. R. Stoop, Napanee; J. W. Scott, Warsaw, and O. L. Barger, Converse.

OHIO, THIRD DISTRICT, MEETING.

A meeting of the Independent telephone delegates from the companies in the third district of the Ohio Independent Telephone Association, numbering over sixty, held their regular semi-annual meeting at Zanesville, Ohio, on October 19. The sessions were wholly informal. In the evening a theater party was enjoyed by the visitors.

From the reports made at the present time 19,123 Independent telephone subscribers are enjoyed in the third Ohio district, these being accommodated by 90 exchanges. Toll stations to the number of 178 are also established in the district.

This district, of which J. E. Rhodes is vice-president, is composed of Coshocton, Guernsey, Belmont, Monroe, Noble, Washington, Perry, Morgan, Meigs, Athens, Muskingum and Licking counties. Each of these was represented.

A number of the visitors addressed the informal meeting, the first held in the local district since last March. Among these speakers were Messrs C. Y. McVey, M. B. Overly and F. L. Cary, of Cleveland; Frank L. Beam, president of the state association, of Mt. Vernon; A. B. Doudna, of Bridgeport; Dr. F. C. Huth, of Woodsfield; C. L. Jones, of Athens; S. C. Kissner, of Coshocton; William Hoyle, of Cambridge; W. H. Bowman and Judge Wheeler, of Caldwell; C. H. Deer, of Summerfield, and a number of others.

It was the general impression of all attending the meeting that rapid advancement was in sight in Independent circles. A rise in Independent telephone securities has occurred of late and with the interesting of large corporations to some

extent in all local companies it is hoped a uniform system of operation may soon be secured.

IOWA TOLL LINE CLEARING HOUSE.

At its recent meeting in Des Moines, the Iowa Toll Line Telephone Company decided to incorporate a clearing house company with a capital stock of $10,000. A committee of five was appointed to draft the constitution. The clearing house will be located in Des Moines. The committee appointed was made up of C. C. Deering, of Boone; E. H. Martin, of Webster City; P. A. Holdoegel, of Rockwell City; J. M. Plaister, of Fort Dodge, and C. G. Cockerell, of Jefferson.

The representatives of sixteen Iowa toll line telephone companies were in attendance at the meeting. The clearing house will make out the regular reports for the companies, saving each one the trouble of making out its own report as well as reports of companies doing business over its line and of those over whose lines it does business.

MISSOURI, FIRST DISTRICT, MEETING.

The first district meeting of the Missouri Independent Telephone Association, comprising ten counties in northwest Missouri, was organized at the Hotel Metropole, St. Joseph, Mo., September 29. The following officers were elected: President, H. E. Ralston, Maryville; vice-president, S. D. Thompson, Cameron; secretary and treasurer, F. G. Funston, St. Joseph. Mr. Funston, who is superintendent of the Citizens' Telephone Company, of St. Joseph, will be the active representative of the first district, and will give his attention to maknig the organization effective. A constitution and by-laws similar to those already adopted or to be adopted in the other nine districts was formulated at the opening session. James F. Barnett, of Memphis, Mo., secretary and organizer of the state association, presided at the session.

TEXAS CLEARING HOUSE FOR INDEPENDENTS.

The Texas Independent Telephone Clearing House Association has been organized at Dallas and application made to the secretary of state for a charter.

The purpose of the organization is to facilitate the concentration of Independent telephone business in Texas. This will be a mutual benefit to several scores of telephone companies operating over the state.

The Fort Worth Telephone Company reports that its line into Dallas will be completed and ready for business on or about the first day of November.

Long-distance connections have been recently completed form Fort Worth to Waxahachie, Waco, Houston, San Antonio and intervening points by this company.

INDIANA, FOURTH DISTRICT, MEETING.

The fourth district of the Indiana Independent Telephone Association, composed of the following counties, Tippecanoe, Carroll, Montgomery, Warren, Benton, Clinton and Fountain, recently met at Lafayette for organization. O. P. Friberg, manager of the Lafayette Telephone Company, is president of the district. An executive committee was appointed as follows: Harry Lutz, Odell; W. H. Holt, Otterbein; Frank Goodwine, West Lebanon; W. C. Wright, Hillsboro; Levi Kratzer, Mulberry; J. L. Osborn, Veedersburg; E. B. Walker, Delphi.

SOUTHERN INDIANA MEETING.

The Southern Indiana Independent Telephone Association recently met at New Albany. Nine counties are comprised in this district. One of the important transactions of the session was the dissolution of the association, the members of which will join the State Independent Telephone Association. The counties formerly comprising the Southern Indiana Association will now be known as the tenth district of the state association, with Charles D. Knoebel as district vice-chairman.

NEBRASKA MEETING, NOVEMBER 11.

The Nebraska Independent Telephone Association will meet in Hastings November 11 in the new building of the Hastings Independent Telephone Company. The purpose of holding the meeting in that city is to allow the members to inspect the new exchange, which, though not yet completed, is said to be noted as a model exchange. W. E. Bell of York is president of the association and F. E. Ebersole, manager of the Lincoln Telephone Company, is secretary.

OHIO, NINTH DISTRICT, MEETING.

The semi-annual convention of the ninth district of the Ohio Independent Telephone Association was held at Mansfield, Ohio, on October 17. The ninth district is composed of the following counties: Crawford, Richland, Ashland, Wayne, Holmes, Morrow, Knox, Union, Delaware, Licking, Franklin, Fairfield and Hocking. Dwight E. Sapp, Mt. Vernon, is vice-president. The meeting was well attended and enthusiastic.

MISSOURI, SECOND DISTRICT, MEETING.

The second district meeting of the Missouri Independent Telephone Association, was held at Chillicothe, Missouri, September 27, and was a success in every respect. There were thirty companies in this district who paid up the membership fee and became members of the district and the state association. There were many important questions as to operating toll lines taken up and satisfactorily disposed of.

OHIO, SECOND DISTRICT, MEETING.

The second district of the Ohio Independent Telephone Association held its meeting at Canton, Ohio, on October 19. Forty-six representatives of Independent telephone companies in the district were present at the meeting, which was opened by President W. F. Laubaugh, of Akron. The meeting was largely attended and the proceedings were most interesting.

MISSOURI, THIRD DISTRICT, MEETING.

A meeting of the third district of the Missouri Independent Telephone Association was held at Moberly, Missouri, on October 3, over thirty managers and operators being present. The meeting was a success in every way, the various reports received showing a very prosperous condition.

OHIO, EIGHTH DISTRICT, MEETING.

A meeting of the Independent telephone companies of the eighth district, which includes the counties of Williams, Fulton, Lucas, Ottawa, Sandusky, Seneca, Wood, Henry and Defiance, was held at Toledo, Ohio, on October 4. R. E. Hamblin, Toledo, is vice-president of the district.

MISSOURI, SIXTH DISTRICT, MEETING.

The sixth district of the Missouri Independent Telephone Association has been organized at Clinton, Missouri, by electing the following officers: President, G. W. Schweer, of Windsor; vice-president, R. M. Scraggs, of Warsaw; secretary and treasurer, M. Golliday, of Holden.

TEXAS MEETING, NOVEMBER 7-8.

The Texas Independent Telephone Association has been called to convene in Dallas, Texas, November 7 and 8. The officers of the association are as follows: President, E. W. Dunaway; secretary, J. B. Earle.

Manufacturers' Department

A NEW ANCHOR.

A new anchor for guying telephone or electric light poles has recently been put on the market, and is attracting a great deal of attention. The name, The D. & T. Anchor, was taken from a description of its operation, the D and T being the first letters of the words drive and twist. This anchor, which is illustrated herewith, is driven into the ground with a sledge or maul to a depth of about five feet. The shaft is then twisted to the right three revolutions, by threading the bar through the eye, the revolution of the shaft spreads the blades to an angle of ninety degrees with the shaft itself. This spreading of the blades is caused by the peculiar shape, which is something like that of the blade of a screw propeller.

Fig. 1 is taken from a photograph of the anchor when being driven into the ground. Fig. 2 shows the anchor after it is driven into the ground and the shaft has been twisted three revolutions. These interesting photographs were obtained by driving the anchor into the ground and then digging the dirt away from the plane of the anchor to a distance of about six feet on either side. They well illustrate the unique idea of the anchor. Fig. 1 shows that the ground is not disturbed in the least by driving the anchor into the soil. Fig. 2 shows the enormous holding power which the anchor will have in undisturbed ground.

The anchor is made up in four sizes for light work, ordinary, heavy and dead ending cables. The Number 1 is made with a five foot five-eighth inch steel shaft formed into a ring at the top, carrying at the bottom the wings which spread eight inches and are two and one-half inches wide. They are supported on the shaft by a five-sixteenth inch pin made from tool steel. Number 2 is made with a seven-eighth inch solid steel shaft six feet long, formed into

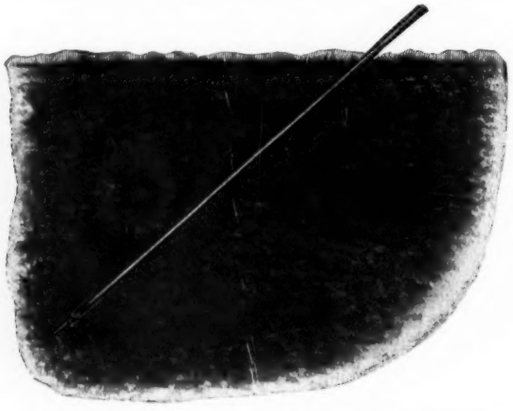


FIG. 1.—ANCHOR IN GROUND BEFORE BLADES ARE SPREAD.

a ring at the top, carrying at the bottom the two wings which spread eleven by two and one-half inches wide. These are supported by a five-sixteenth tool steel pin. Number 3, which is recommended for toll line work, is made with a six foot seven-eighth inch steel shaft, with the bull ring at the top, carrying wings which spread twelve by three and one-half inches wide. The pin supporting the wings is one-half inch tool steel. Number 4 is the same construction as Number 3, excepting that the wings spread eighteen inches. In order to save the stock around the pin, a hole has been made for the pin by spreading the rod in place of drilling the hole. In this manner the entire strength of the heavy shaft is saved.

The company claims that on account of the unique manner in which the blades are spread at a depth in the ground that this type of anchor has a holding power much greater than that of any other on the market; also that it can be installed in sixty seconds. It reports that one construction foreman who has used the Number 2 anchor states that he has installed them in ordinary solid sand in twenty seconds.

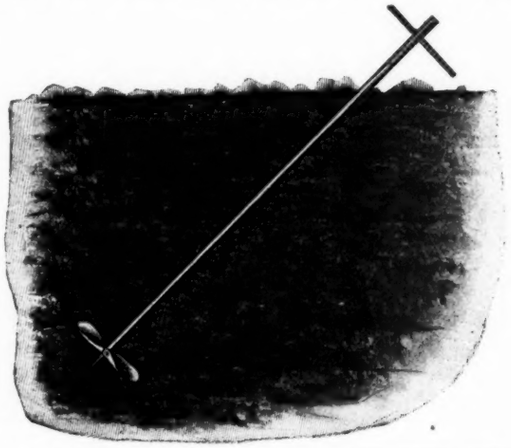


FIG. 2.—ANCHOR AFTER BLADES HAVE BEEN SPREAD.

This ease of installation makes the cost of placing the anchor in the ground remarkably low. The D. & T. Anchor Company of La Crosse, Wisconsin, who are manufacturers of these anchors, will be pleased to send circulars showing their merits and also a souvenir model upon application.

A NEW MONARCH CATALOGUE.

The issuing of a new telephone catalogue by the Monarch Telephone Manufacturing Company of Chicago brings to mind the rapid growth of this company during the five years of its existence. It started in an entirely different manner from most manufacturing companies inasmuch as it commenced business with a single part of a telephone, the ringer, and sold nothing but this part instead of starting with a complete telephone composed of parts purchased elsewhere.

The Monarch ringer soon became a factor in the telephone field, and after it was thoroughly established, the company took up the manufacture of a generator. The Yaxley generator was a fit companion for the ringer, and so it was that the two important parts of the ringing circuit were produced and placed on the market.

Not satisfied to confine its efforts to the making of two parts only, the company designed and built a transmitter which was easily up to the high standard already established, and the transmitter soon led to a receiver. It was then only a short time until an induction coil, hook, switch and arrester were added. Thus all of the parts of a magneto telephone were made, but not until the fall of 1902 did the assembly of the Monarch telephone commence. Up to that time, the entire output of the ever enlarging factory was taken by manufacturing companies and used in other telephones. At this juncture the Monarch company devised and patented a method of assembly for a compact type tele-

phone which was claimed to be a marked improvement over all previous methods. The idea is now undoubtedly familiar to everyone, as it has been advertised, tried and proven successful in every way. Briefly, this idea is to mount the parts upon removable shelves which can be slipped from the cabinet without breaking any soldered connections and without disturbing any of the permanent wiring. It is fully described in the new catalogue and will interest any who are not already acquainted with it.

The advent of a telephone so simple, substantial and efficient as that produced by the Monarch company was popularly received, and during the last three years Monarch telephones have gained the reputation which they so rightfully deserve.

The new telephone catalogue mentioned above is now being printed and will be ready for distribution about November 15th. It contains 56 pages of descriptive matter, profusely illustrated with half tone cuts. Copies will be sent to those sending their names and addresses.

THE COUCH DESK SET.

The S. H. Couch Company of Boston, Massachusetts, has recently placed on the market a new form of desk telephone to be used in connection with its automatic reset button switch intercommunicating system. An illustration of this

COUCH NUMBER 44 DESK SET.

desk set is shown herewith. The talking instrument consists of a hand micro telephone with four feet of flexible cord. The automatic reset button switch is contained in an oak box fastened to a one-inch heavy brass tubing. A support is furnished for fastening to the end of the desk or partition. The tube fits the support in a manner easily adjustable as to height and position.

The advantages of this type of desk telephone for an intercommunicating set are that it is entirely out of the way and yet within easy reach of the user and cannot be confused with the exchange telephone. The reset mechanism is entirely mechanical, there being no magnets with contacts to get out of order. The instruments are made up in standard sizes arranged for from ten to thirty stations, although large sizes can be made. The box usually is of quarter sawed oak, dark finish. The switch is fitted when required with an exchange button for connecting to a common battery system and at the same time cutting out the intercommunicating system.

The S. H. Couch Company also manufactures a full line of wall sets to work in connection with this desk set, as well as a portable desk set with automatic button switch, the buttons being arranged in the base in a circle and automatically restored mechanically. This desk set is made up to twenty-six stations. Booklet Number 9 describes these various instruments and will be sent to anyone interested upon request.

CUT OUT BOXES FOR TELEPHONE COMPANIES.

In the advertising columns of Telephony will be found an advertisement of the Lyon Metallic Manufacturing Company, Chicago, who manufacture cut-out boxes for telephone companies. These boxes are giving universal satisfaction,

LYON CUT-OUT BOX.

and are already meeting with a very gratifying sale throughout the field. This is a comparatively new device and one which will interest many of our telephone readers. The Lyon Metallic Company's iron cut-out boxes are made from No. 16 gauge sheet metal and the seams are all lapped on the inside. They are coated with high-grade insulating paint, which makes them positively fire and water proof and neat in appearance. In the construction of these boxes special attention has been paid to the knockouts, which is a very important factor.

PATENT TELEPHONE DIRECTORY.

In the advertising section of Telephony this month will be found the advertisement of the Patent Telephone Directory Company, Chicago, which is placing upon the market a very convenient device for keeping memoranda regarding telephone subscribers. This device can be very satisfac-

THE PATENT TELEPHONE DIRECTORY.

torily employed by a large majority of the telephone companies throughout the United States, as a substitute for their regular subscribers' directories. They are not only very convenient and ornamental, but, it is stated, can be furnished in quantities for a sum as cheap or cheaper than the ordinary directories can be printed. As will be readily seen, a device of this kind also enables telephone companies and their subscribers to make any changes or additions at a moment's notice. All told, it would soon be a matter of

economy and convenience to substitute the Patent telephone directory in place of the old style book which is frequently lost or mislaid. Our readers who are interested in a proposition of this kind are invited to address the Patent Telephone Directory Company at 67 Clark St., Chicago, for full particulars regarding its proposition.

COMMERCIAL ELECTRICAL SUPPLY COMPANY'S NEW BUILDING.

The Commercial Electrical Supply Company, of St. Louis, Missouri, began business in March, 1899, at 1007-09 Market street, St. Louis, and has steadily grown until it has been compelled to secure larger quarters, moving to its new quarters September 1, 1905. The new building is located at 15th and Pine streets, St. Louis, and has a floor space of over 40,000 square feet (compared to 10,000 in the old building), which is entirely devoted to electrical apparatus. This new building is one of the largest and most beautiful

COMMERCIAL ELECTRICAL SUPPLY COMPANY'S NEW BUILDING.

electrical houses in the west. The first floor is equipped with the most modern office fixtures.

The officers of the company are W. F. Nolker, president; L. T. Nolker, vice-president and treasurer; W. H. Nolker, secretary; J. P. Casey, sales manager; A. B. Wilson, assistant sales manager, and E. C. Brewer, manager of the telephone department. The accounting department is also located on this floor and is very handsomely furnished. A large space is devoted to the comfort of the patrons and is arranged with desks, tables, reading matter, writing material and a stenographer. In fact, everything to make the customers feel at home and welcome.

Quite an extensive space is devoted to the telephone department, which contains a very elaborate and complete display of commercial high-grade telephones and switchboards. The equipment is connected up in the regular way, showing in detail the construction of a telephone plant. Mr. Brewer has been a very active and successful worker in the Independent field, and would be glad to see all his old friends at his department with the above mentioned company. The telephone department has a bureau of information which is always at the service of the public. Inquiries regarding the construction, maintenance and problems connected with telephony are solicited. The company carries a complete line of telephone exchange equipment in stock, consisting of construction material of all descriptions, switchboards and over five hundred instruments of every design. The basement, second, third and fourth floors are devoted to stock, which is most complete in assortment.

A private branch exchange with fifteen branches connecting with the Kinloch company is also installed in the house. With this outfit they are able to reach a good many thousand customers over the country on the long-distance Independent telephone.

SWEDISH-AMERICAN RINGERS.

The illustrations shown herewith present to the reader a very clear idea of the new ringer manufactured by the Swed-

FIG. 4.

ish-American Telephone Company, Chicago. Fig. 1 shows magnetic field of old style ringer with magnet on side, the dotted lines, according to the company's statement, show the

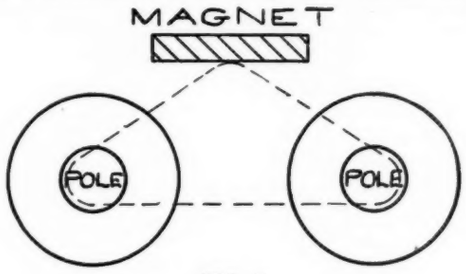


FIG. 1.

unbalanced magnetic path. In Fig. 2 is shown the magnetic field of the Swedish-American new patented ringer with magnet in center. Fig. 3 shows the end section view of the new ringer, and Fig. 4 shows the ringer complete.

The Swedish-American company claim to be the first to manufacture a perfectly balanced ringer movement, and state that the bells will ring louder on account of a perfectly bal-

anced magnetic field. This ringer is claimed to be superior in many ways, not only in increase in efficiency, but permits of the most compact and durable construction, fewer parts,

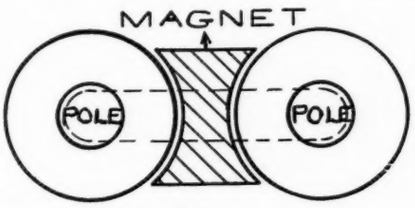


FIG. 2.

more permanent and positive adjustment, but is said to operate for a longer period of time at a less cost for maintenance

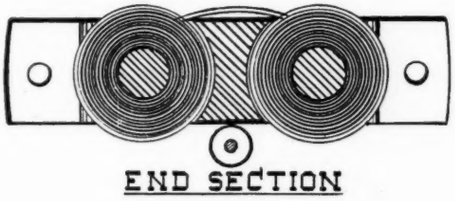
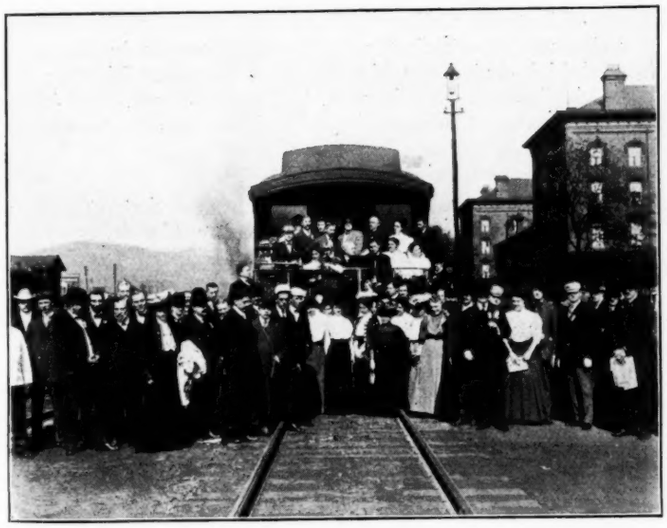


FIG. 3.

All Swedish-American telephones are equipped with the new ringer.

THE ROYAL BLUE.

The Baltimore and Ohio Railway Company extended an invitation to the Chicago Press Club and the prominent western trade paper publishers of the west to go to New York on a special train (The Royal Blue) and inspect the many improvements made by the company in the last few years. A party numbering one hundred boarded the special on October 10 at Chicago and returned on October 16, after visiting Washington, Baltimore, New York, etc. At Washington the party was taken to the White House in automobiles and met the President. At Baltimore the Travelers' and Merchants' Association tendered a luncheon, at which addresses were made by the governor of Maryland and mayor of Baltimore. The New York Press Club entertained the visitors for three days in New York. A trip to Ellis and Blackwell Islands, an automobile tour of the city, banquet, smoker, theater party, trip through Chinatown, and a visit to the Hippodrome was provided.



PRESS CLUB PARTY AND THE ROYAL BLUE TRAIN AT CUMBERLAND, MD.

The trip was unquestionably one of the most enjoyable and instructive ever taken by the newspaper men and publishers of the west. The Baltimore and Ohio Railway Company excelled its well-known reputation as host. A splendid special train with all its adjuncts. The menu was unexcelled and the service perfect. Each evening the ladies of the party were presented with bunches of American Beauty roses, and in the morning boxes of bon bons. Books and magazines were provided, nothing being overlooked that would add to the comfort and convenience of the party.

The one thing that added so much to the comfort of the trip was the splendid condition of the roadbed. The company has made many improvements in the system during the past eight or nine years, and made it practically a new road and one of the best in the country. Some hundred million dollars has been expended in this direction.

Among the publications represented were: Ten-Story Book, Mixed Stocks, Hotel World, City Press Association, The Western Fireman, Farm Implement News, Examiner, Grain Dealers Journal, Lake Marine News, N. A. R. D. Notes, Lumber Review, National Laundry Journal, American Lumberman, The Investigator, Galena Gazette, Mail Order Journal, The Gregg Writer, Record-Herald, The Illinois Odd Fellow, Monumental News, Live Stocks, National Harness Review, Construction News, Evening Post, Tribune, Calumet Record, American Lumberman, Black Diamond, Daily News, Coal Trade Journal, Furniture Journal, National Builder, A. N. Kellogg Newspaper Co., Common Sense, Inter Ocean, Polish Telegraph, American Sugar Industry, American, Wayside Tales, Burlington Gazette, Evening Journal, The Red Book, The Mining Review and Metallurgist, Modern Machinery, Hotel Monthly, People's Companion, Law Bulletin, Western Publisher, National Daily Review, Events, and TELEPHONY.

The Royal Blue train carrying the party was under the personal direction of Mr. Mandel Sever, the Baltimore and Ohio Railway Company's press representative.

WHITNEY GUARANTEE.

Machado & Roller, New York general sales agents of the Whitney Electrical Instrument Company, have adopted the following guarantee label, which will be affixed to every Whitney instrument sent out in future:

We guarantee that the materials entering into the construction of this instrument are of the best of their respective grades, flawless so far as careful inspection could determine, and that the workmanship is also of the best.

We further guarantee that this instrument has been tested and found to be in proper adjustment and calibration on this date. Any re-calibration, re-adjustment or repair that may be required within a period of one (1) year will be effected by us gratis; provided that the instrument is returned with seals intact to this point, charges prepaid, for that purpose. If the seals are broken, a charge will be made and no charges for repairs made by other parties without our written consent will be recognized.

WHITNEY ELECTRICAL INSTRUMENT COMPANY.

In speaking of this broad guarantee Mr. Roller stated that the Whitney company makes its sweeping guarantee feeling assured that purchasers of instruments will appreciate the elimination of the possibility of disputes with transportation companies because of damage that may be received by apparatus while in transit, and incidentally, of course, that its liberal policy will result in further increase in business. The Whitney company's records show that the repairs on its apparatus total but a small sum and that practically all of them arise from accidents in transit, so that it figures that it is well worth while for it to go to the trouble of collecting claims from the express company itself for the purpose of cementing its friendship with its customers.

Trade Notes

AMERICAN ELECTRICAL WORKS, Providence, R. I., has issued a new net price list and discount sheet on its complete line of wire, cords and cable.

THE W. G. NAGEL ELECTRIC COMPANY, Toledo, Ohio, is sending out leaflets describing the Hercules anchor, Andrews operator's chairs and Anvil steel tackle bolts.

FRANK B. COOK, Chicago, is sending out a neat folder describing the Universal guy clamp, "U" bolt clips and multiple contact test connector, together with special prices.

THE ELECTRIC APPLIANCE COMPANY, Chicago, is sending out unique postcards, advertising its very successful "X. P." condenser for increasing the efficiency of party line service.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, reports a heavy demand for its new type compact magneto telephone known as the new Swedish beauty number 88.

W. R. BRIXEY, 203 Broadway, New York City, manufacturer of "Kerite" wires and cables, is distributing to patrons a glass desk weight, embellished with a very good photograph of that well-known gentleman.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, Missouri, in the October issue of the "Everbest" magazine, contributes the usual collection of interesting sketches and data concerning the use of the apparatus handled by this company.

THE COMMERCIAL ELECTRICAL SUPPLY COMPANY, St. Louis, Missouri, is mailing circulars calling attention to the merits of Vought-Berger telephones, D and T anchors, Sandwich pole changers, tubular line fuse protectors, wire connectors, etc.

COPPER GOSSIP, issued by the National Conduit and Cable Company of New York City, contains in the October 16 number a resume of the general business outlook in copper, the market situation here and abroad, exports and imports and other interesting data.

THE NEWHALL CHAIN FORGE AND IRON COMPANY, 9-15 Murray street, New York, has issued and is sending to the trade catalogue number 99 containing illustrations and descriptions of its line of cross arm braces, guy clamps, pole steps and other telephone specialties.

ELECTRIC GAS LIGHTING COMPANY, 115 Purchase street, Boston, Massachusetts, has recently published a book on telephone and annunciator practice, giving a few examples of representative installations. The book is beautifully printed on high grade paper and may be had without cost by addressing the company.

THE CROWE NAME PLATE AND ENGRAVING COMPANY, Chicago, succeeding the Crowe Metal Manufacturing Company, issues with its change of name a new catalogue illustrating in colors the various finishes of name plates. It is the first effort on the part of name plate makers to illustrate in this practical way. It is a handsome display and a desirable adjunct to the office library. The company will be pleased to send the catalogue in colors, showing a very extensive variety of metal name-plates and advertising signs.

THE ILLINOIS ELECTRIC COMPANY, Chicago, has recently issued a new net price and discount sheet applying to catalogue number 17. Printed matter describing some of the more important telephone specialties, construction material and supplies has been issued with the price list and will be sent upon request.

L. B. ALLEN COMPANY, INCORPORATED, Chicago, Ill., manufacturer of the Allen soldering specialties and commutator lubricant, has opened an office in New York City, at 97-98 Warren street. The company will be ably represented by Mr. A. Hall Berry, who will give prompt and courteous attention to all inquiries.

THE LYON METALLIC MANUFACTURING COMPANY, Chicago, has within the past year almost doubled its capacity and another increase of about the same extent is booked to take place next spring. The firm manufactures an excellent line of lockers, metal shelving for stock rooms and cut-out boxes, all of which find a ready sale among telephone companies.

THE Bureau of Forestry U. S. A., will no doubt be in a position to report on results obtained by the use of Avenarius Carbolineum as a wood preservative, under its own supervision at some future date, as it recently concluded extensive experiments with this preparation on poles used in the experimental lines in the states of North Carolina, New Jersey, Pennsylvania and New York.

THE BURDICK ENAMEL SIGN COMPANY, 52 State street, Chicago, had a very handsome exhibit at the Advertising Show held at the Coliseum, October 11th to 18th. Other advertisers who exhibited who are well known in the telephone field included the Meyercord Company, Chicago; H. D. Beach Company, Coshocton, Ohio, and Cross, Press and Sign Company, Chicago, all of whom handle telephone signs.

THE NEW VISUAL SIGNAL MAGNETO SWITCHBOARD made by the Chicago Telephone Supply Company, Elkhart, Indiana, is said to be especially adapted for use in connection with party lines at sub-exchanges, where the operator does not stay at the board all of the time. A handsome catalogue, profusely illustrated, may be secured upon request from Chicago Telephone Supply Company, Elkhart, Indiana.

THE ROCK ISLAND BATTERY COMPANY announces the removal of its factory to Cincinnati, Ohio, where it will occupy a building with over 40,000 square feet of floor space, equipped with the latest improvements and most modern machinery. This move was made necessary by the company's rapidly growing business, which can be handled promptly from the new quarters. All inquiries should be addressed to 456-462 East Sixth Street, Cincinnati, Ohio.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, New York, has issued bulletin No. 13, dealing with intercommunicating telephones. This system has been devised especially for the rapid transaction of business between the various departments of a single concern. Each telephone can be equipped with exchange connections, making it possible to carry on conversation with outside parties. The bulletin is an exceptionally neat publication, and is well illustrated. Diagrams are given to

show the methods by which the various telephones are connected in circuit.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, has issued folders No. 4 and No. 8, dealing, respectively, with magneto local-battery telephones and common-battery switchboards. In folder 4 are shown numerous diagrams of telephone circuits for the various uses to which telephones may be put. Folder 8 shows front and rear views of the internal mechanism of common-battery switchboards and also illustrates the apparatus used in the switchboards.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, are sending to the telephone trade a new bulletin, number 100, descriptive of its new party line system. This is the first bulletin of the new series which will eventually describe all of the Dean product. The size is practically uniform with that of the very large manufacturing concerns in the telephone field, and is uniform with the bulletins used by the large electric manufacturing companies. The company would be pleased to send this bulletin to any one requesting it.

THE STANDARD POLE CHANGER and the Standard Duplex set continue to be two of the very best selling telephone specialties of the season. These two articles were devised by a thoroughly practical telephone man, who had been through all of the customary experiences from an operating standpoint and who set himself to work to effect some substantial economies. That he succeeded is evinced by the large and growing list of customers for the Standard pole changer and duplex set. The Current Electric Company, 52 State street, Chicago, is the manufacturing and selling agents for the Standard specialties.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, New York, report having closed contracts for switchboards for the following places; Sonora, Ky.; Minneapolis, Minn.; Moosminsaskatchewan, N. W. T.; Pattersonville, N. Y.; Des Moines, Ia.; Seward, Ill.; Sublette, Ill.; Little Valley, N. Y.; Beloit, Kan.; Milbank, S. D.; Wheeling, W. Va.; Linn Grove, Ind.; Brooten, Minn.; Abbott, Texas; Vertrees, Ky.; Payette, Idaho; Hammonton, N. J.; Chenoa, Ill.; Tiskilwa, Ill.; Swedesboro, N. J.; Roxboro, N. C.; Onaga, Kan.; Rochester, N. Y.; Ellicottville, N. Y.; Eldorado, Ark.; Wabash, Ind.; Newark Valley, N. Y.; Camden, N. J.

THE NEW TRADEMARK of the F. Bissell Company of Toledo, Ohio, is shown herewith in a modified form from that which has been already illustrated in the reading and advertising pages of TELEPHONY. The trademark is considered to be of great advertising value, and will, in this new combination, be used in all the advertising of the company and on all its manufactured product. As will be noted, the distinctive frog emblem is retained, but it is now enclosed in an oval band giving the name and address of the Bissell company.

THE EUREKA ELECTRIC COMPANY, Genoa, Illinois, has met with great success with its new number 7-L local battery and new number 7-C common battery types of transmitters. The company is especially anxious to hear from exchanges who are having transmitter trouble. A sample transmitter will be sent on trial on receipt of a postal. The company also reports large sales of its Carter improved test set. This instrument is sent on thirty days' trial. It will pay to investigate the merits of this test set; it has several advantages over the common lineman's test set. The company will be pleased to send you illustrative and descriptive matter on this instrument promptly on receipt of request.

A. S. MERRILL, who has for a number of years been associated with the New York office of the Chicago Fuse Wire and Manufacturing Company, has established an office at 227 Fulton street, New York City, and has made arrangements with the Appleton Electric Company of 224 Washington street, Chicago, Illinois, to take charge of its entire business in the eastern part of the country. With Mr. Merrill will be associated his brother, Frank H. Merrill. The Appleton Electric Company is well known as a manufacturer of telephone fuse blocks and fuses, guy clamps, cable hangers, copper test connectors, distributing boards, tubular line fuses, glass fuses, tested fuses, wire and strip fuse links, lock nuts, bushings, etc.

THE WILLIAM ROCHE DRY BATTERY COMPANY, New York City, has been incorporated and now owns the business which has been conducted since the year 1897 by William Roche at No. 52 and 54 Park Place. The company is organized under the laws of the state of New York, with a fully paid capital of $25,000. Mr. William Roche is president of the new corporation, and has associated with him C. Layton Ford, formerly first vice-president of the Celadon Roof Tiling Company, New York City; Ernest A. Lowe, president of the Lowe Electric Company, and William C. Hubbard, for a number of years with the Westinghouse Electric and Manufacturing Company. The assets of the business have been taken over by the new corporation, and all of its liabilities have been assumed and will be paid by the new company.

MACHADO & ROLLER of New York have opened in Chicago, at 421 Monadnock Block, a general western sales office for the Whitney Electrical Instrument Company. H. I. Shire, from the New York office of Machado & Roller, will have full charge and act as general sales agent for Whitney instruments. Mr. Shire has been with Machado & Roller for seven years and is fully conversant with the business of the Whitney company and the technical details appertaining to the instruments. The Chicago office is in a position to make simple repairs on instruments, and is carrying a full stock of Whitney instruments, from which quick shipments can be made from Chicago as a center. Already the wisdom of the company in thus opening a branch office in the West has been demonstrated by a flattering number of orders.

THE CHICAGO TELEPHONE SUPPLY COMPANY, Elkhart, Indiana, is calling attention to the method of mounting induction coils in Chicago bridging telephones. The coil can be removed and replaced without unsoldering or resoldering any wires. This feature will appeal to those exchanges which have rural party lines. The company announces that the Kilbourne & Clark Company of Seattle and San Francisco have established a Pacific coast agency for Chicago telephones. A full line of telephones and switchboards will be carried in stock for quick delivery. The company has issued a new list of books on the following subjects: Magneto telephones, express switchboards, visual signal and toll boards, common battery apparatus, automatic equipment. Copies of any or all of these books may be secured upon request, without charge, from Chicago Telephone Supply Co., Elkhart, Indiana.

ARTICLES OF INCORPORATION were recently issued in Columbus, Ohio, to the Selective Telephone Manufacturing Company of Springfield, Ohio. The company is capitalized at $60,000. Its members are James M. Brailey of Toledo, and C. D. Juvenal and William M. Bruce, Jr., of Springfield. The purpose of the organization is to manu-

facture a selective telephone apparatus which has been perfected in the local shop of the parties interested. They have the invention now ready for extensive manufacture for general use. It is a mechanism for use on party lines, by which a person using the line can lock out the other subscribers, so that they can neither cut in on him nor hear his conversation. The organizers of the company have had a shop in the building of the Rogers Tool Company on Mulberry street, Springfield, where they have been perfecting the invention for the past year. For the present the company will occupy its present quarters, but the erection of a new plant is one of its plans for the future.

THE STANDARD MANUFACTURING COMPANY, 268 Noble avenue, Bridgeport, Connecticut, whose output comprises telephones and electrical appliances of all kinds in addition to parts of machinery for other factories, has made an important addition to its business staff. Mr. Watson A. Jordan of New York, designer and inventor of special automatic machinery has become connected with the company. Mr. Jordan, who is a mechanic of established reputation, is to be superintendent of the works and the company is to be congratulated upon having obtained the services of such a valuable man. The company has doubled its capacity recently and is rushed with orders that will keep the extra force of hands busy right through the winter. The showing of the past and the consistent development of the business is a source of much gratification to the concern which comprises up-to-date business men. At the rate that the business has increased of late it will not be long before the company will be compelled to expand its quarters.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY has been increasing the capacity of its factory, which will permit it to double the output. Some of the recent shipments of Century apparatus are: Telephones and two switchboards to the Patrons Telephone Company of Fulton, N. Y.; Switchboards and telephones to the following: Citizens' Telephone Company of Little Valley, N. Y.; the Attica Telephone Company of Attica, N. Y., and the Williamsville Telephone Company of Williamsville, N. Y. Also a complete central office equipment to the Weedsport Telephone Company, Weedsport, N. Y. Switchboard to the Springville Telephone Company, Springville, N. Y., also to the Hamburg Telephone Company, Hamburg, N. Y. Complete central office equipment to the Rush Telephone Company, Rush, N. Y. The company is also building a multiple, common battery, lamp signal switchboard for the Livingston County Telephone Company of Dansville, N. Y., and for the Citizens' Telephone Company of Bath, N. Y. Both of these exchanges will be equipped for the Century four party selective system.

THE H. W. JOHNS-MANVILLE COMPANY, 100 William street, New York City, has issued a new electrical catalogue, No. 14. This catalogue is handsomely bound in cloth, and is replete with interesting data and specifications of electrical auxiliary apparatus. This catalogue supersedes all previous issues. All weights given are approximate, and numbers and code words are to be used in ordering. The book is carefully indexed under several sections. Section 1 describes trolley line material; section 2, trolley ears, clips, splicing sleeves, etc.; section 3, strain insulators and turn buckles; section 4, pole bracket arms and section insulators; section 5, pole-line and third-rail insulators; section 6, miscellaneous materials; section 7, tools; section 8, "Noark" enclosed fuses and devices; section 9, molded mica sockets; section 10, electric heaters and electrotherms; section 11, "Vulcabeston" and molded material; section 12, general information and data; section 13, telegraph code; section 14, indexes. The company calls particular attention in the catalogue to Telephone Transite. This is an especially prepared fire and water resisting sheet, designed to meet the requirements of telephone operating and manufacturing companies for partition linings, as a fireproof barrier between telephone wires, to eliminate the spreading of fire from one set of wires to another, and similar uses common to this service. It has been adopted by the New York & New Jersey Telephone Company, New York Telephone Company, Western Electric Company, Public Service Corporation, and many other large interests. It is regularly furnished in sheets forty by forty inches, either one-eighth or one-quarter inch thick. The catalogue will be sent postpaid upon request.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, has been awarded a contract by the Citizens' Standard Telephone Company of Kingston, N. Y., for a complete central office equipment for its new exchange. The switchboard is to be of the common battery lamp signal multiple type of 3,000 lines capacity in 6,400 line sections. The switchboard equipment is to include a two position toll board, a combined chief operator's and monitor's desk, a wire chief's desk, main and intermediate distributing frames, relay racks and a complete power plant. This new exchange is to have a full equipment of the Dean-four-party line selective system, including four-party individual indicating ringing keys in each local cord circuit and a duplicate set of ringing machines. The company has also received an order from the Albany Home Telephone Company of Albany, N. Y., for a four-position, two-section multiple toll board complete with all necessary apparatus and circuits to give the latest and best method of toll operating. Calculagraphs for accurately timing toll messages are also included in the equipment.

THE EUREKA ELECTRIC COMPANY, Genoa, Illinois, has recently put on the market several small types of switchboards, ranging in capacity from five to forty numbers. The same equipment is used in these small boards that has made the company's larger boards a factor in the telephone field, and any exchange that contemplates installing boards of this type will do well to get literature and prices before buying. The company has recently delivered and installed switchboards, large and small, in Wilcox and Franklin, Nebraska; Poyner and Amarilla, Texas; Toronto and Harvard, South Dakota; Flemingsburg, Kentucky; Atwater, Minnesota; Wabena, Wisconsin; Alameda, Northwest Territory, Canada; Texico, Mexico; Lealand, Illinois; Apure, Venezuela, South America. The company has just issued a neat booklet entitled "Letters of Credit." This booklet contains over one hundred testimonials received from exchanges during the past two months, showing the appreciation of the new equipment put out during the past year. The company will be pleased to mail a copy to all exchange managers, also additional literature describing its new switchboard and telephones.

THE ARMAC MOTORCYCLES.

The Armac Motor Company has recently removed from St. Paul, Minnesota, to commodious quarters at 464 Carroll Ave., Chicago, where it will have greatly enlarged facilities for manufacturing this well-known machine.

The Armac motorcycle is one of the most powerful machines on the market, and, its manufacturers claim, is also the most easily regulated. It is a thoroughly practical machine, designed for all-around purposes. The Armac company does not manufacture a racing cycle, but caters exclusively to that class of trade which wants a thoroughly reliable, strong and easily regulated machine for business purposes. The Armac motorcycle can be operated at a

speed of less than four miles per hour. During the past season one of their customers—a man weighing 220 pounds —rode an Armac machine all over the hills and rough roads of Pennsylvania and New York without a mishap of any kind.

The Armac company is prepared to figure with telephone companies on a machine especially designed for "trouble shooters."

AVENARIUS CARBOLINEUM.

The Carbolineum Wood Preserving Company, of Milwaukee, Wisconsin, report a steadily increasing demand for Avenarius Carbolineum from telephone companies. The following letter from Frank M. Dougherty, of Concordia, Kansas, president of the Concordia Telephone and Telegraph Company and superintendent of the Union Telephone and Telegraph Company, gives a very good idea of the universal satisfaction with this method of pole preserving. The letter follows:

The Concordia Telephone & Telegraph Co.
Frank W. Dougherty, Prest.
Concordia, Kas., Oct. 4, 1905.

Carbolineum Wood Preserving Co., Milwaukee, Wis.

Gentlemen—I am in receipt of your favor of the 20th ultimo in which you state that you would like to have us give your Avenarius Carbolineum a trial, etc.

You are certainly mistaken, we have not only given it a fair trial, but specify it in all the work we have done ourselves, and have "hollered our heads off" to our neighbors about it. We have furnished sample poles to your agents to use as advertisement, and taken great pains to show benefits derived from it. As taxpayers, we have tried to persuade our county commissioners to use it on all bridgework. We have shown the results to farmers who use fence posts, to the superintendents of large telephone and telegraph companies and within the last three days had a long talk with the roadmasters of one of the largest railroad systems of this country, telling them of the great benefits to be derived from its use and our experience with it.

We have poles set for over five years treated with Avenarius Carbolineum that are in perfect condition—the sapwood not even rotted—not a wormhole in them—while poles set only a few months before without being treated, are badly worm eaten and decayed.

If all your patrons feel as friendly to your product as the writer you will certainly be well advertised. Refer any prospective purchaser to me and I will give them the benefit of my experience and observation.

Yours very truly,
FRANK W. DOUGHERTY.

CAPITALISTS BUY INDIANAPOLIS COMPANIES.

Control of the Indianapolis Telephone Company and the New Long Distance Telephone Company of Indianapolis has passed into the hands of interests outside of Indianapolis, but closely allied to large Independent interests of other cities of the country. A. H. Bauer, of Bauer Bros., of St. Louis; H. C. Stifel, treasurer of the Althemer & Ralings Investment Company, of St. Louis, and James S. Brailey, Jr., of Toledo, represent the new interests in the local field. Mr. Brailey, speaking for the new owners, said:

"We have closed a deal whereby we have become interested in both the Indianapolis and New Long Distance Companies, and we have, at the same time, an understanding with certain local interests by which the management and control of the companies will be satisfactory to us. We have become interested in these companies as telephone men. We were attracted to them because we thought they have a future, and that our telephone experience, both in the construction and operation and in the financing of telephone companies, would be of material assistance to the companies. As far as we are concerned, we are interested in the property as a property itself. No other companies are to be taken up in connection with these two, and we expect to be permanently interested in them. We propose that the companies shall remain distinctively home and Independent companies now and in the future."

The National-Interstate Telephone Association

General Headquarters - CLEVELAND, OHIO

October 21, 1905.

OFFICIAL BULLETIN NUMBER FOUR

OFFICE:

Maps—The Association has completed a map of Ohio, showing about seventy-five per cent of the Independent toll lines in that state. Copies of this are being furnished to the journals for publication. Data for a large number of the lines not shown has been received since tracing for the present map was made up and data for the remainder is being gathered as rapidly as possible. All of these lines will be included in a later edition.

We are preparing maps of other states as quickly as we can and expect to finish several within the next month. We desire to thank the Independent companies who have already assisted us in making up our maps, but must express our disappointment at the lack of interest displayed by a number of others. We ask that all of our requests for maps or incidental information or assistance be given prompt attention, so that this work may be completed at an early date and the expense of draughtsman, etc., reduced to a minimum.

Mailing list—Besides preparing maps showing the Independent development in the various states we are revising our mailing list. Every Independent company who has not already done so is requested to send us a list of their officers and directors. We wish to thank those who have responded.

SUPPLY DEPARTMENT:

Quite a number of the Independent companies are taking advantage of our supply department, and we should like to hear from all who have not yet given us an order. The advantage of using a standard toll sign is evidently being recognized by many of the Independents, judging from the orders received here daily. Up to date, several thousands of these signs have been shipped, almost every state in the Union being represented. We have a great many orders for all classes of other supplies, our business card and directory cover proving especially popular. One company alone during the past week placed an order for fifteen thousand of the covers, and we had previously received among our other orders two for twenty thousand each.

So many requests have been received for a lapel button of the official shield that we have decided to handle this, and have arranged to furnish a very neat design in solid gold and red, white and blue enamel. Sample will be sent upon receipt of thirty-five cents, which is the price we will be able to make on these buttons in single orders. Prices in quantities given upon application.

EXECUTIVE COUNCIL:

A meeting of the Executive Council will be held during the month of November.

COMMITTEES:

Committees arranged for at the Chicago Convention will be appointed and announced in the next Bulletin.

OBITUARY:

We regret to announce the death of Mr. W. D. Barnard of Philadelphia, member of the Executive Council, who died at 1:30 A. M., October 16th. The Association loses a valuable member and the Independent interests a warm friend and supporter in the death of Mr. Barnard. His successor on the Executive Council will be announced in the next Bulletin.

Incorporations of the Month

ARKANSAS.

NEWCASTLE—The Mercantile Telephone Company. Capital stock $17,000, of which $425 has been subscribed and paid in. The officers are as follows: President, J. F. McDougal; vice-president, J. Dillon, Sr.

CALIFORNIA.

FOWLER—The Fowler Telephone Company has been incorporated at this place, with R. B. Reid as superintendent.

SANTA PAULA—The Santa Paula Telephone Company has been incorporated in this city with a capital stock of $60,000. The directors of the company are as follows: C. F. Guthridge, M. Zalun, Arthur Wright, D. E. Boyce, C. F. Platte.

COLORADO.

COLORADO CITY—The Home Telephone Company has been incorporated at this place with a capital stock of $50,000. Incorporators are R. M. Handy, C. E. Dolph and others.

SPRINGFIELD—The Springfield-Lamar Telephone Company. Capital stock, $3,000. The incorporators of the company are as follows: John L. Petticrew, F. E. Lamposi, Alfred B. Allen. The principal office of the company will be in Springfield.

GREELEY—The Northern Telephone Company has been incorporated in this city with a capital stock of $250,000. The officers of the company are as follows: President, C. H. Ramsey; first vice-president, C. V. Callahan; second vice-president, Dr. H. C. Bennett; secretary and treasurer, S. H. Southard.

IDAHO.

LEWISTON—The Home Telephone Company has been incorporated at this place with a capitalization of $50,000. The officers of the company are as follows: President, C. F. Osmers; vice president, E. R. Windus; treasurer, Eugene Alford; manager, J. E. McGillivray.

ILLINOIS.

QUINCY—The Quincy Automatic Telephone Company has increased its capital stock from $15,000 to $1,000,000.

TAYLORVILLE—The Christian County Telephone Company. Capital stock $10,000. Incorporators, W. W. Taylor, W. B. Adams, R. K. Williams.

EL PASO—The Grand Telephone Company has been incorporated at this place with a capital stock of $2,000. The incorporators are E. P. Armstrong, C. A. Cull, F. I. Jones.

IOWA.

BADGER.—The Badger Telephone Company has been incorporated in the city.

FLORA—The Home Telephone Company. Capital stock, $5,000. Incorporators, Harry E. Soesbe, H. E. Studebaker, Joseph Studebaker.

MALLARD—The Mallard Mutual Telephone Company, recently organized with a capital stock of $12,000, has filed articles of incorporation. The incorporators are J. P. Mulroney and others.

TRAER, Ia.—The United Exchange Company has been incorporated with a capital stock of $35,000. The officers of the company are as follows: President, John Stewart; secretary and treasurer, J. H. Shoemaker; manager, R. L. Parker.

UTE—The Soldier Valley Mutual Telephone and Telegraph Company has been incorporated at this place with a capital stock of $5,000. The incorporators of the company are as follows: S. D. Crary, Dr. B. C. Stewart, E. B. Ullrich, C. J. Bartels, Henry Witte and others.

INDIAN TERRITORY.

NOWATA—The Delaware Telephone Company of Nowata.

KANSAS.

ASHLAND—The Clark County Telephone Company.

ELLIS—The Ellis Telephone Company has been incorporated in this place.

CALDWELL—The Caldwell Telephone Company has been incorporated here.

DRESDEN—The Dresden Telephone Company has been incorporated at this place, with a capital stock of $4,000.

COLUMBUS—Articles of incorporation have been issued to the Selective Telephone Manufacturing Company of this city. The company is capitalized at $60,000. The members of the company are James M. Brailey of Toledo, and C. D. Juvenal and William M. Bruce, Jr., of this city.

PARSONS—The Citizens' Home Telephone Company has been incorporated in this city with a capital stock of $500,000 by the following incorporators: James Plottner and George Yeager of Kansas City, Fred Perkins and D. J. Romine of Oswego, George Spangle of Chetopa and C. H. Kimball and F. H. Brown of Parsons.

KENTUCKY.

LOUISVILLE—The Fern Creek Telephone Company has filed articles of incorporation with a capital stock of $999.

WHITESBURG—The Whitesburg Telephone Company. Capital stock, $10,000. Incorporators, D. D. Fields and son.

CORNETTSVILLE—The Cornettsville and Leatherwood Telephone Company has been incorporated with a capital stock of $15,000.

MASSACHUSETTS.

BALDWINSVILLE, Mass.—The Otter River Telephone Company has been incorporated with a capital stock of $1,000.

MICHIGAN.

DETROIT—Articles of incorporation of the Home Telephone Company have been filed with a capital stock of $10,000. The incorporators are as follows: Max Koehler, Samuel B. Jeffries, St. Louis; C. M. Burton, T. A. E. Weadock, Detroit.

MINNESOTA.

ST. JAMES—Articles of incorporation have been filed by the St. James Telephone Company of St. James, with a capital stock of $25,000.

GARFIELD—The Farmers' and Merchants' Co-operative Local Telephone Company has been formed at this place with a capital stock of $10,000, by Peter Engstrom and Gustaf Loo.

MISSOURI.

ST. LOUIS—The Telephone Construction Company has been incorporated in this city. Capital stock $15,000. The incorporators are as follows: R. T. Spencer, Charles Sutler, J. M. Murphy, J. L. Herman, J. J. Schatzman.

MONTICELLO—The Northeast Missouri Telephone Company has been incorporated at this place with a capital stock of $35,000. The incorporators are as follows: F. L. Marchand, C. H. Bradshaw, Oliver C. Clay, W. B. Henton, George W. Marchand and others.

NEW JERSEY.

CAMDEN—The Southern Telephone Company has been incorporated in this city, with a capital stock of $100,000. The incorporators of the company are as follows: John F. Landis, Lulan Landis, J. Ray Boone.

TRENTON—The Cream City Telephone & Telegraph Company has been incorporated in this city, with a capital stock of $125,000. The incorporators are: Norman Malcolm of Chicago, E. W. Denison of Orange, N. J., and William Lohman of New York.

NEW YORK.

BUFFALO—The H. G. Pope Electric and Manufacturing Company. Capital stock, $200,000. The incorporators are H. G. Pope and associates.

ASHFORD—The West Balley Telephone Company has been incorporated, with a capital stock of $3,000. The directors are as follows: F. E. Link, L. Fish, Harvey Vedder, Ashford.

LITTLE VALLEY—The Citizens' Telephone Company has been incorporated in Little Valley with a capital stock of $30,000. The directors are as follows: S. N. Wheaton, A. E. Darrow and E. M. Waite, of Little Valley.

ALBANY—The Great Eastern Telephone Company of New York City. Capital stock, $100,000. Directors, William Schack, Eugene H. Brock, Elias J. Beach, Egbert A. Reynolds, D. A. Reynolds of New York, Stephen M. Conger of Brooklyn.

WEST VALLEY—The West Valley Telephone Company has been incorporated at this place with a capital stock of $3,000. The incorporators are: Christian Ehman, William H. Proctor, and Fred E. Link, all of West Valley, N. Y., and others.

VARYSBURG—The Tonawando Valley Telephone Company has

been incorporated with headquarters in this city. The company already has about eighty subscribers. The company will furnish service to Varysburg, Johnsonburg, North Java and the surrounding districts.

ATTICA—The Attica Home Telephone Company has been organized by the citizens of this place with a capital stock of $10,000. The directors of the company are George T. Loomis, Clarence L. Beane, W. A. Joiner, Elon P. Spink, Hugh Miller, Carlton D. Wing, Henry B. Flach.

NEW YORK—The Hall Telephone Manufacturing Company has been incorporated in this city with a capital stock of $50,000. The incorporators of the company are as follows: Richard B. Constantine, South Orange, N. Y.; John P. Gillis, Seaford, Del.; Edward J. Hall, 592 Tenth street, Brooklyn, N. Y.

BATH.—The Bath and Mitchellville Telephone Company has been incorporated with a capital stock of $1,000. The incorporators of the company are as follows: Clarence Myrtle, Thomas W. Robinson, Martin Armstrong, Leroy Keeler, and Clarence G. Carey, all of Bath; Frank O. Rice, Wheeler, N. Y.; Henry Faulkner, Urbana, N. Y.

TICONDEROGA—The Ticonderoga Home Telephone Company has been incorporated at this place with a capital stock of $25,000. The incorporators of the company are as follows: Robert N. Clemons, Dresden Station, N. Y.; Thomas J. Smith and J. H. Mathews, both of Whitehall, N. Y.; James A. McLaughlin, Putnam, N. Y.; and others.

NORTH DAKOTA.

CASSELTON—The Western Telephone Company has been incorporated at this place with the following officers: President, Oliver Dalrymple of Casselton; vice-president, Wm. Dalrymple of Duluth; secretary and treasurer, John Dalrymple of Casselton; superintendent of construction, Chas. C. Dalrymple of Tower City.

OHIO.

NORTH FAIRFIELD—The North Fairfield Telephone Company has been incorporated at this place with a capital stock of $5,000 by C. R. Irwin, Leroy Hoyt and others.

AUSTINBURG—The Austinburg Telephone Company has been incorporated with a capital stock of $5,000 by the following incorporators: F. M. Houghtaling, Tracy D. Herrick, George H. Webb, M. B. Andrews, W. H. Barnes.

OKLAHOMA.

OKEENE—The Mutual Telephone Company has been incorporated in this city with a capital stock of $15,000. The directors of the company are as follows: H. Slemmer, P. D. McClung, S. L. Andrews, W. H. Scarth, S. S. Hendrickson, all of Okeene.

SOUTH CAROLINA.

CLINTON—The Clinton Telephone Company has been incorporated at this place with a capital stock of $25,000.

DARLINGTON, S. C.—The Interior Telephone Company has been incorporated with a capital stock of $26,000. The incorporators of the company are as follows: F. L. Harrell, L. S. Welling, W. D. Coggeshall and William Haynsworth.

SOUTH DAKOTA.

HURON—The State Independent Telephone Company has filed articles of incorporation. Capital stock is $1,000,000. The incorporators of the company are K. S. G. Hutchinson, Coe I. Crawford and others.

CUSTER, S. D.—Articles of incorporation have been filed for the Eldorado Mutual Telephone Company, with a capital stock of $25,000. The incorporators are William Nevin, T. V. Carlock and Thomas W. Delicate.

TEXAS.

HUMBLE, TEX.—The Humble Telephone Company has been incorporated at this place with a capital stock of $2,000.

OLDENBURG—The La Grange and Waldeck Telephone Company has been chartered. The incorporators are Louis Voeckel, Jr. Charles Franz and others.

CHILDRESS—The Childress-Wellington Telephone Company has been incorporated with a capital stock of $5,000 by the following persons: R. H. Norris, B. B. Bates, B. Pixler, Tom Jaycox, S. P. McMinn.

CANADIAN.—The Stockmen's Telephone Company has been incorporated here with capital stock of $2,500. The incorporators are as follows: George Gerlach and D. J. Young, of Canadian; W. H. Black and Tom Connell of Lipscomb, Texas; A. H. Jines of Jines, Texas, with F. M. Vermillion of Goodwin, Okla., as territorial agent.

ANNUAL MEETINGS.

VALLEJO—The Vallejo Township Telephone Company has elected officers as follows: President, J. H. Caltoft; vice-president, Wm. Risk; secretary, J. R. Peters; treasurer, F. Whitlatch.

ILLINOIS.

AURORA—The Interstate Telephone and Telegraph Company has elected the following officers: President, H. H. Evans; vice-president, V. A. Watkins; treasurer, J. F. Harrar; secretary and general manager, E. R. Conklin.

LITCHFIELD—The stockholders of the Montgomery County Telephone Company have elected the following officers: President, C. H. Poland; vice-president, H. H. Zimmerman; secretary and treasurer, Robert Barnard; directors, A. G. Butler, Dr. M. Moyer, G. W. Rainey, A. K. Vandiver, August Kellenburger, H. H. Zimmerman, C. H. Poland, George D. Taylor, Robert Barnard.

IOWA.

HARLAN—The Shelby County Telephone Company has elected the following officers: President, Frank Faltonsen; vice-president, G. W. Cullison; secretary, Andrew Raasch: treasurer, George McMullen of Irwin.

NEW LONDON—The New London Telephone Company recently held its annual meeting and elected directors for the ensuing year as follows: John T. Laughlin, W. J. Francy, J. L. Portlock, J. E. Peterson, J. T. Whiting, W. R. Buchanan, C. P. Johnson.

DIXON—The members of the German Mutual Telephone Company recently met in this place and elected officers as follows: President, Charles Pausern; vice-president, John Greve; secretary, Peter Blunck; treasurer, Gustave Alf; director, Henry S. Blunck.

SIOUX CITY—The first annual meeting of the stockholders of the Sioux City Telephone Company was held recently in this city and the old board of directors was re-elected as follows: T. A. Thompson, E. W. Rice, D. S. Lewis, F. L. Eaton, W. P. Hanley, Howard S. Baker and George C. Scott.

MAINE.

PALERMO—The Palermo Telephone Company has been incorporated at this place, with a capital stock of $5,000. The officers of the company are as follows: President, S. F. Bowler; treasurer, W. W. Turner; directors, M. J. Nelson, N. A. Nelson, W. S. Jones.

MANCHESTER—At a recent meeting of the Woodland Telephone Company, held at this place, the following officers were elected for the ensuing year: President, Frank Collins; treasurer, James Collins; directors, F. C. Collins, J. T. Collins, Mrs. Nellie Collins, Mrs. Mary Collins and George R. M. Wentworth.

MASSACHUSETTS.

BUCKLAND—The annual meeting of the Heath Telephone Company, with headquarters at Shelbourne Falls, was held in this place recently and the following officers elected for the ensuing year: President, W. E. Kinsman of Heath; clerk and treasurer, Herbert Newell of Shelburne Falls; directors, W. E. Kinsman and D. G. Taylor of Jacksonville, Vt., Herbert Newell and George E. Davis of Shelburne Falls, Fred L. Totman of Conway.

MISSOURI.

TARKIO—The Atchison County Mutual Telephone Company has elected officers as follows: President, D. H. Kemberling; vice-president, J. L. Beck; secretary, George H. Shandy; treasurer, R. M. Stevenson.

HANNIBAL—The Bluff City Telephone Company has elected officers as follows: President, J. F. Davidson; vice-president, T. G. Dulong; treasurer, J. P. Hinton; secretary and general manager, H. G. Conger.

NEW JERSEY.

BORDENTOWN—The Bordentown Telephone & Telegraph Company has elected the following directors: J. P. Hutchinson, Fred G. Wiese, John Enright, Barker Gummere, Jr., H. R. Schwartz, F. A. Demarest, William S. Hancock.

NEW YORK.

BUFFALO—At the annual meeting of the Frontier Telephone Company, recently held in this city, the following directors were elected for the ensuing year: William H. Andrews, Charles E. Austin, Martin Carey, Robert W. Chapin, William A. Douglas, Charles W. Goodyear, R. R. Hefford, Bert G. Hubbell, Clark L. Ingham, Andrew Langdon, F. C. M. Lautz, H. H. Littell, E. C. Lufkin, H. H. Persons, George A. Plimpton.

IN THE RURAL LINE DISTRICTS

Bess Brown left Monday for Jefferson City, where she has a position as telephone girl.—*California Dispatch.*

C. A. Heath has the poles scattered for a telephone line from Hollow road to his house.—*Stewartstown Democrat.*

George Denny has hitched on to No. 7 telephone line. He has just put in his new phone and intends to do more talking and less walking.—*North Salem Items in Brookfield (Wis.) Budget.*

Manager Glenn of the Crawford County Telephone Co. now looks up trouble on a brand new Pope motor cycle. It makes lots of noise, but it gets there just the same.—*Denison (Iowa) Review.*

Another telephone is stepping into town from the west. We trust that it will be a decided improvement over the old lines and not foster profanity.—*Hamilton Items in Jordan (Minn.) Independent.*

J. M. Calhoun has purchased a water mill near Marianna and will erect cotton jins, grist mill, for the manufacture of shuttle blocks and telephones.—*Marianna Correspondent in Chattanooga (Tenn.) News.*

E. M. Ford of Effingham came down on the B. & O. excursion Sunday and spent the day with old friends and acquaintances. Elley is manager of the Wabash Telephone Co. of that city and from his appearance is being well fed. He looks well and hearty.—*Shawneetown (Ill.) Democrat.*

The manager of the Mudville Local Ex. installed a polechanger last month. About the same time he changed a line of poles from an alley to the street. A lady on coming into the office and hearing the vibrator inquired what it was and on being told that it was a polechanger, remarked, "Oh, yes, they *are* changing the poles, aren't they?"—*Mudville Weekly Post.*

A new telephone scheme has been thought out by J. T. Flynn of this city. While he believes it will be responsible for many fatalities, he says he is going to push it for all it is worth. At the Hotel Cecil yesterday he explained his idea. "My plan is an extremely simple one," he said, "and it will meet with the approval of every man and woman who desires to utilize the telephone for the purpose for which it is intended. You go to a telephone booth under

my system and talk. At the end of sixty seconds you get a slight shock. This signifies that it is up to you to finish up quick. If you don't take the hint at the end of a couple of minutes, a shock sufficient to half paralyze you, leaving only sufficient energy to hang up the receiver, comes. If you are still dense at the end of three minutes a shock will come that will end it. I tried to patent the apparatus, but was told at the patent office in Washington that I would be instrumental in killing off half the people in the United States. I am going to make another try at a patent, however."—*Seattle (Wash.) Post-Intelligencer.*

When Jo. Lombard of the Twin City Telephone Company was in town last week he made a mistake which might have had serious consequences. In the night he got up to take some grape wine. By mistake he got into a veterinarian's grip and took out a bottle of

dehorning fluid. The color was all right and was what fooled him. His mouth was badly burned, but the curious part of the affair was that within a half hour after he took the fluid all the corns on his feet dropped off.—*Windom (Minn.) Citizen.*

Patrons of those divisions of the Southern Indiana Telephone System which radiate from Dillsboro unanimously declare that Miss Cora Carnine has no superior and but few equals in the matter of service given as a "hello girl."—*Versailles (Ill.) Republican.*

The telephone system is reported to have been quite busy during the first few days that it was passable for farmers' line in the Devils Nest. Jake Gesler is busy as a bee on the line and will soon be in Crofton to operate on the county line.—*Bloomfield (Neb.) Monitor.*

Another meeting of the Pig Ridge Telephone Company was held Wednesday night. The line is a sure "go," as most of the poles are out now. Look out, central, or some Pig Ridge resident will be calling for "number 6 on the clothes line."—*Pig Ridge Correspondent in Fairfield (Ill.) Sun.*

The way the Corn Belt Telephone Co. is fixing up the old Cedar Valley line is pleasant to see. Large strong poles, broad arms and they didn't cut down all the shade trees you have in front of your residence. We hope now for good, prompt service.—*Raymond Items in Waterloo (Iowa) Reporter.*

Aubra Eastman passed through here Monday, interviewing us in the interests of the telephone company; and now let me say, ladies, that a complaint has been made that you are too long winded. My advice to you is to cut it short—cut it off in the middle.—*Higgins Hill Correspondent in Fort Fairfield (Mo.) Review.*

The Illinois Telephone Company have most all their poles hauled for their line through the Horn and will begin work soon, and if the people of the Horn do not hear something it will not be the fault of the telephone companies, as both lines are through the Horn.—*Buckhorn Correspondent in Jacksonville (Ill.) Currier.*